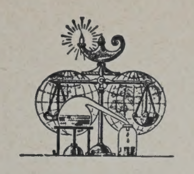
COMPTES RENDUS XXIII CONFERENCE

IUPAC

INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY

UNION INTERNATIONALE DE CHIMIE PURE ET APPLIQUÉE



COMPTES RENDUS
XXIII CONFERENCE

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The XXIIIrd Conference of the International Union of Pure and Applied Chemistry was held in Paris, 2–9 July, 1965, at the Conservatoire des Arts et Métiers and at the Centre national de la Recherche scientifique in Gif-sur-Yvette.

The XXth International Congress on Pure and Applied Chemistry was held in Moscow, 12–18 July, 1965. The Congress, which was extremely successful, owed much to the efforts of Prof. V.N. KONDRATIEV, Chairman of the Congress Organizing Committee and Vice-President of IUPAC.

La XXIII[e] Conférence de l'Union Internationale de Chimie Pure et Appliquée s'est tenue à Paris du 2 au 9 juillet 1965, au Conservatoire des Arts et Métiers et au Centre national de la Recherche scientifique à Gif-sur-Yvette.

Le XX[e] Congrès International de Chimie Pure et Appliquée s'est tenu à Moscou du 12 au 18 juillet 1965. Cette manifestation, qui connut un immense succès, doit beaucoup aux efforts du Prof. V.N. KONDRATIEV, Président du Comité d'Organisation du Congrès et Vice-Président de l'IUPAC.

SÉANCE SOLENNELLE D'OUVERTURE DE LA XXIIIe CONFÉRENCE INTERNATIONALE DE CHIMIE PURE ET APPLIQUÉE

au Conservatoire des Arts et Métiers, Paris, 2 juillet 1965 à 17 heures

Le Prof. G. CHAUDRON, Président du Comité National de Chimie de France, en inaugurant la XXIIIe Conférence de l'IUPAC, souhaita la bienvenue à Paris aux Délégués et Membres de l'IUPAC. Il présenta ensuite le Prof. J. TRÉFOUËL, Président de l'Académie des Sciences, Directeur honoraire de l'Institut Pasteur. Le Prof. TRÉFOUËL prononça alors une conférence magistrale dont le texte intégral est donné ci-après. Cette conférence avait pour titre:

Réflexions à propos de la Recherche scientifique

La protection de la science marquera notre siècle comme celle de la philosophie, de la littérature ou de l'art a illustré les siècles précédents.

Les importants moyens financiers mis actuellement à la disposition des chercheurs s'expliquent par les spectaculaires réalisations accomplies dans les domaines les plus divers mais dont l'origine fut parfois modeste. Un double enseignement peut être tiré: savoir utiliser au mieux les ressources de l'heure sans oublier les caractéristiques ayant marqué les époques moins privilégiées.

D'un article qu'écrivait en 1935 LECOMTE DU NOUY et dans lequel il évoquait les incroyables difficultés financières auxquelles se heurtaient encore les savants, j'extrais ces quelques lignes, bien savoureuses:

«on estime que l'homme qui se consacre à la science aime profondément son métier et que son travail l'amuse; il faudrait alors voir là une sorte de vengeance de la part de ceux que leur travail ennuie».

A trente ans de distance, quel magnifique retournement de situation et quels échos des articles tels que celui-ci n'ont-ils pas éveillés dans l'esprit de ceux qui ont en mains les destinées de la recherche scientifique.

Le rôle primordial de la science est devenu peu à peu d'une extraordinaire évidence: en physique atomique, chimie des protéines, synthèse des acides aminés, étude des macromolécules, cybernétique par exemple, les réalisations notées sont étourdissantes. Et que dire de ce que nous constatons chaque jour, presque sans émerveillement, avec cette confiance en la science qui tend vers l'absolu: l'homme se meut dans le cosmos, décèle au microscope électronique la structure intime d'un virus, généralise la transmutation des métaux, guérit des maladies réputées incurables, suit, enfin, les traces de Paracelse, le père de la médecine hermétique.

Des esprits préparés ont réussi ces tours de force par l'acuité de leur perception tout autant que par des soutiens pécuniaires inespérés. Ces soutiens sont maintenant acquis définitivement: l'outillage industriel ou de laboratoire s'est perfectionné; les chercheurs sont l'objet de préoccupations constantes, depuis l'instant où ils s'installent sur les bancs des Ecoles jusqu'à celui où, armés de leurs sciences nouvelles, ils pénètrent dans les temples de leur activité future. Ces privilégiés d'aujourd'hui y trouveront les moyens pratiques de résoudre, d'emblée, des problèmes qui auraient nécessité des journées de recherche il y a peu d'années encore.

Et là se pose le grand point d'interrogation. Ce confort matériel les libérera-t-il des préoccupations secondaires, leur permettant de spéculer en toute liberté et d'élargir le champ de leur pensée ou ne représentera-t-il pas un certain élément d'anesthésie de l'attention, de la perception ?

Je ne puis résister au désir d'opposer deux textes extraits, l'un de ces

mêmes pages de PIERRE LECOMTE DU NOUY, l'autre d'un article de MAURICE PONTE paru dans la C.S.F. Revue.

Le premier évoque «les heures inoubliables passées au laboratoire face à face avec les instruments qu'on a souvent conçus soi-même, dans un but particulier, épiant, le cœur battant, la marche d'une expérience; quand l'appareil nous apporte la réponse que nous attendons, alors nous avons vraiment conscience d'une victoire de la pensée sur la matière mystérieuse et rusée, enfin contrainte de livrer un de ses secrets. A coup sûr, chaque savant a connu des minutes semblables; tous se sont grisés de la même émotion ou alors ils ne sont pas de vrais chercheurs. Il faut un élément émotionnel sentimental dans toute carrière créatrice. Il arrive qu'au cours d'une telle expérience on fasse l'observation d'un fait nouveau, imprévu, étranger au but expérimental poursuivi. Chaque fois que pour étudier un problème on est amené à créer ou à perfectionner des techniques d'observation ou de mesure, on est certain de rencontrer des faits inédits qui deviendront, si on le désire, l'origine d'investigations nouvelles».

Si j'ai cité aussi longuement ce passage du livre de LECOMTE DU NOUY c'est que chacune des idées exprimées rejoint celles qui m'ont ébloui depuis le début de ma vie de chimiste jusqu'à cet instant où ma double carrière de chercheur puis de directeur d'un Institut de recherches m'autorise à faire le point ainsi que je me permettrai de le développer tout à l'heure.

Mais auparavant il me semble passionnant de juxtaposer un extrait du remarquable article de MAURICE PONTE, antithèse des lignes précédentes, qui ne fait que renforcer leur sens:

«Aux Etats-Unis, où les crédits de recherches ne font pas défaut, les grands laboratoires sont très vite suréquipés. Dans un laboratoire de chimie, un étudiant faisait une manipulation avec un appareil de distillation fractionnée. La colonne de distillation était cachée et l'appareil était tellement perfectionné que les différentes fractions étaient recueillie à part sans que l'on ait besoin d'intervenir. De ce fait, l'étudiant ne faisait rien; le phénomène même de la distillation fractionnée lui échappait... la technique avait tué l'enseignement. Je ne veux pas dire qu'il faille supprimer la technique dans les laboratoires de recherche ni qu'il faille revenir à la pauvreté et à la pénurie qui ont presque toujours accompagné le savant jusqu'à présent. Cela serait d'ailleurs bien impossible. Je veux dire que la richesse technique est un danger pour le chercheur qui risque de se démettre d'une part de ses facultés intellectuelles.»

Après avoir fait l'apologie du développement des crédits réservés aux scientifiques, je ne voudrais pas que vous puissiez supposer que j'émets le plus léger regret d'un état de choses qui nous permet, entre autre, de lutter à armes égales avec l'étranger et qui représente l'évolution inéluctable et la plus souhaitable du déroulement de notre recherche. Mais ayant acquis ces facilités qui permettent à la majorité des travailleurs d'obtenir un rendement inespéré il s'agit encore de rester en état d'alerte pour découvrir des esprits neufs, inventifs, passionnés, capables de puiser dans leur propre substance les secrets de l'éblouissement, de la révélation de l'idée créatrice. Le Professeur MONTEL émettait beaucoup plus qu'une boutade lorsqu'il s'écriait: «Oui, il nous faut des chercheurs, beaucoup de chercheurs, mais ne pourrait-on avoir aussi quelques trouveurs?»

A ceux-là, qu'un véritable chef devine aisément à l'étincelle du regard, à la vivacité de la répartie, à l'acharnement avec lequel ils poursuivent une expérience, oubliant les heures qui passent, à ceux-là, avec respect, la liberté d'action et de pensée doit être accordée.

Bien entendu, une idée de départ, un plan d'expérience est indispensable. Mais il faut comprendre que le véritable chercheur ne peut pas être l'esclave de ce plan, qu'il doit rester l'esprit libre, apte à tout percevoir.

Il ne s'agit pas nécessairement de génie comme ce fut le cas pour LOUIS PASTEUR; comment oublier ce jour où devant des poules résistant à des inoculations de cultures *vieillies* de choléra puis de cultures *virulentes* toujours mortelles, PASTEUR s'écrie: «elles sont vaccinées.»

D'autres processus de découverte existent, tout aussi fructueux et l'exemple de la mise en lumière des propriétés de la Pénicilline est tout un enseignement. FLEMING, dans le laboratoire du brillant ALMOTH WRIGHT accomplissait «son travail quotidien, se tenant toujours prêt à remarquer l'inattendu et à en mesurer l'importance» – ANDRÉ MAUROIS. C'est ainsi que les boîtes de Petri où il avait ensemencé ses cultures microbiennes étaient toujours conservées assez longtemps pour vérifier leur comportement à long terme car FLEMING était réellement habité par ce rêve, jugé utopique par des savants tels que BEHRING et ALMOTH WRIGHT lui-même: trouver une substance sélectivement pathogène pour les bactéries, c'est-à-dire capable de les tuer tout en respectant la vitalité des cellules de l'hôte. Lysozyme et Pénicilline lui donnèrent raison. La découverte du premier est la consécration de l'esprit de méthode: FLEMING, atteint de corrhiza, déposa sur l'une de ses boîtes de Pétri un peu de son mucus nasal: il constatait bientôt qu'autour de ce point, les cultures de bactéries ne se développaient pas. Un principe actif était donc contenu dans le mucus nasal; il le baptisa lysozyme et le retrouva dans les larmes, le lait, le blanc d'œuf; son pouvoir antibactérien était faible, limité, mais le rêve prenait corps et FLEMING se trouvait prêt à accueillir la seconde observation que la plupart des bactériologistes aurait sans nul doute laissé échapper: une moisissure de l'air, un Penicillium, tombé sur une boîte de Pétri ensemencée, lysait les bactéries dans la zone de son développement... quelles étonnantes propriétés devait posséder le produit de secrétion du Penicillium... FLEMING l'appela Penicilline mais n'étant point chimiste, il ne put isoler, concentrer, purifier ni le lysozyme, ni la pénicilline.

A New York, en 1939, au Congrès International de Microbiologie consacré presque exclusivement aux succès remportés par les Sulfamides, je rencontrai FLEMING et il me dit combien ces communications renforçaient sa foi dans les possibilités de ses propres découvertes, restées sans écho depuis dix ans. Avec une ardeur nouvelle il chercha les scientifiques capables de s'attaquer à ce problème que résolut enfin le grand chimiste ERNST CHAIN. En 1944, alors que l'Angleterre ne connaissait point encore la paix, j'allai à Oxford visiter l'Institut dirigé par Sir HOWARD FLOREY et j'assistai à un spectacle bien émouvant: les premières préparations de Pénicilline. Aucun appareil n'avait pu être soustrait aux usines de guerre et le matériel du laboratoire de FLOREY et de CHAIN se composait de bidons de lait, de tubes de chauffage central, de baignoires et d'ampoules à décantation. Mais l'enthousiasme suppléait à tout: la Pénicilline était prête pour les emplois médicaux qui devaient, pour la seconde fois, assurer la victoire des principes antibactériens, faire de la chimiothérapie l'associée, la complémentaire de la vaccinothérapie et de la sérothérapie. Cet exaltant travail de pionniers devait être suivi de réalisations pratiques devenant chaque année plus considérables et la préparation industrielle de la Pénicilline connut une ampleur mondiale sans précédent. Cette ampleur eut comme autre conséquence de rendre très rapidement possibles l'étude et la préparation des antibiotiques dont le nombre et l'utilisation semblent presque illimités. Quelle magnifique consécration de l'esprit d'observation et d'acharnement de ces trois savants FLEMING, FLOREY, CHAIN qu'un même prix NOBEL devait bientôt récompenser de leurs efforts accomplis dans les plus modestes conditions.

Bien d'autres exemples pourraient être donnés de l'intérêt de certaines découvertes dont la simplicité étonne et se trouve étrangement dépassée

par les services rendus. Je pense au cas des bactériophages dont la taille ne pouvait être déterminée que par ultrafiltration ou ultracentrifugation. Un des chefs de service de l'Institut Pasteur, Pierre Nicolle, a démontré qu'il existe une relation entre la dimension des bactériophages et leur sensibilité au frottement. Par le seul emploi d'un étaleur, tige de verre coudée, présentant une longueur utile de frottement de 1 cm, promené sur la gélose contenant l'ensemencement de bactériophages, Nicolle a constaté que les bactériophages de faible dimension résistaient fort bien alors que les plus gros se montraient très sensibles: il classe ainsi aisément les bactériophages par ordre de taille et signale le rapprochement intéressant avec les résultats de Wollman et Lacassagne sur les rapports entre la dimension des bactériophages et leur radiosensibilité.

Je vous ai menacés, tout à l'heure, d'illustrer mon propos avec la double expérience de ma carrière de chimiste puis de Directeur de l'Institut Pasteur. Permettez-moi, donc très simplement, de retracer tout d'abord devant vous mes joies de chercheur qui durent bien plus à l'atmosphère extraordinaire dans laquelle elles furent poursuivies qu'aux faibles moyens qui leur étaient accordés. Monsieur Roux, Directeur à cette époque, ne nous aurait rien refusé et c'est probablement pour cela que nous avions quelques scrupules à puiser dans un budget que nous savions limité. La sympathie que nous manifesta toujours Monsieur Roux, bactériologiste passionné de chimie, nous était un élément d'enthousiasme beaucoup plus précieux et les visites que nous lui rendions lorsqu'un pas en avant avait été accompli dans nos recherches, représentaient pour nous à la fois un but et un nouvel élan.

C'est à Madame Ramart, Professeur de Chimie Organique à la Sorbonne, que je dois d'être entré à l'Institut Pasteur et jamais je ne saurai assez la remercier d'avoir compris que je pourrais y être à ma place.

J'ai eu la très grande chance de trouver au Laboratoire de Chimie Thérapeutique le patron idéal. L'intelligence d'Ernest Fourneau éblouissait tous ceux qui l'approchaient; elle me fascina dès notre première rencontre et catalysa mes rêves de chercheur. D'un échange d'idées de quelques minutes avec lui, jaillissaient mille possibilités de projets de travail. Mais Ernest Fourneau avait un autre mérite: il savait laisser à ses collaborateurs assez de liberté dans la conduite de leurs recherches pour que le choix qu'ils en faisaient soit un élément supplémentaire d'intérêt. C'est lui qui me suggéra l'idée de reprendre l'étude des acides aminophénylarsoniques abandonnés par Ehrlich en faveur de celle des arsenobenzols, type 606 ou 914, dont les succès avaient été retentissants dans le traitement de la syphilis. Nous pouvions bientôt constater que l'acide acétylaminé correspondant, le 190 F ou Stovarsol était, en fait, fort intéressant: il donnait, en syphilis tertiaire des résultats au moins équivalents à ce que l'on obtenait par la malariathérapie, méthode héroïque mais dont il s'agissait ensuite d'annihiler l'origine. Nous nous passionnèrent, ma femme et moi, pour la préparation des dix isomères du 190 F et de leur essai comparé, dans la syphilis, dont Levaditi s'était chargé sur le lapin et dans la maladie du sommeil dont Mesnil poursuivait l'étude expérimentale sur la souris; ce test présentait un triple intérêt: faible prix de l'animal; quantité infime de médicament nécessaire; rapidité des résultats obtenus: la maladie est si régulière qu'en moins de quelques heures on peut déceler un début d'action ou une action définitive. Mais le Laboratoire de Mesnil était rue Falguière et le nôtre rue Dutot; il nous sembla que tout serait plus facile et plus exaltant si nous pouvions, à chaque instant, suivre l'évolution des souris traitées et guider ainsi notre travail de chimiste. Mesnil voulut bien nous déléguer son assistant, un charmant Espagnol, Navarro Martin qui s'installa dans l'une des pièces du Laboratoire de Chimie; cette collaboration intime demeure l'un de nos meilleurs souvenirs: dès que l'un de nos produits

de synthèse était terminé, Navarro l'injectait à une souris inoculée, dont le sang présentait 5 à 10 trypanosomes par champ de microscope; avec quelle fièvre il examinait la petite goutte de sang prélevée à la queue de la souris, jour par jour, parfois heure par heure, pour suivre la disparition éventuelle des trypanosomes... C'est ainsi qu'il nous fut bientôt possible de sélectionner un isomère du Stovarsol, celui que l'on appela Orsanine lorsqu'il fut utilisé chez l'homme, et qui donnait sur la souris des résultats très supérieurs à ceux obtenus avec les neuf autres isomères. Curieusement, les propriétés thérapeutiques du Stovarsol et de l'Orsanine s'avèraient opposées: la supériorité du premier dans la syphilis, celle du second dans la maladie du sommeil, coïncidaient avec des propriétés physiologiques et physiques totalement différentes: l'importance de la place des groupements chimiques fixés sur le noyau benzénique l'emportait sur leur nature même. C'est un résultat qui peut sembler évident avec le développement de plus en plus poussé de la représentation des molécules dans l'espace; à l'époque, il nous guida bien utilement pour la suite de nos travaux, dès lors basés sur l'idée de la spécificité d'action d'une molécule donnée.

L'étude d'une série d'urées complexes, toujours dans la maladie du sommeil, en fut une nouvelle illustration. Il s'était agi de retrouver la formule, gardée secrète par les Allemands, de leur 205-Bayer, produit d'une telle efficacité qu'ils avaient envisagé de n'en livrer la formule que contre la remise du Cameroun. Ernest Fourneau, qui lisait l'Allemand comme le Français, eut l'intuition de la série chimique dont devait faire partie le 205 et nous demanda à ma femme, à Jean Vallée et à moi, de nous attaquer à ce problème. Neuf mois de fièvre nous permirent, un jour, de découvrir, avec l'un des 200 corps de formule voisine que nous avions préparés, une action étonnante sur la souris: un trois centième de milligramme de ce corps, le 309 F, la guérissait alors qu'à douze milligrammes ce corps ne tuait pas encore la souris; cet invraisemblable coefficient chimiothérapeutique nous fit supposer que notre 309 devait être identique au 205 Bayer (la publication de nos résultats nous valut d'ailleurs la visite du Directeur de la firme Bayer, horrifié et qui nous assurait qu'il aurait payé très cher notre silence). Surprenante aussi se montrait la spécificité d'action de ce corps, d'un poids moléculaire supérieur à 1400: il suffisait de changer la place d'un groupement méthyle pour annuler l'action thérapeutique.

Lorsque Domagk publia l'action du Prontosil sur les bactéries, nous étions prêts à entreprendre l'étude de la transformation de cette molécule jusqu'à ce qu'elle nous livre le secret de son action: le Prontosil, colorant azoïque, ne doit pas son activité thérapeutique à la fonction colorante mais simplement à l'un de ses produits de coupure, le Sulfamide. Ce résultat nous procura une satisfaction d'autant plus intense qu'il justifiait notre croyance en des relations existant entre constitution chimique et activité thérapeutique: les faits contrôlaient bien ici la théorie. Le Prontosil est constitué par deux noyaux benzéniques dont l'un possède une fonction sulfamide; les modifications portant sur ce noyau anéantissaient toujours l'action alors que celles opérées sur l'autre noyau n'avaient aucune influence sur l'action antibactérienne. Concluant donc à l'inutilité de la présence de ce deuxième noyau, nous avons préparé le p. aminophénylsulfamide ou «Sulfamide» et constaté que cette molécule très simple et incolore était bien le support de l'activité du Prontosil.

Pour réaliser les expériences sur l'animal nous travaillions, alors, avec deux amis très chers, Nitti, bactériologiste du Laboratoire de Salimbeni à l'Institut Pasteur et Bovet qui arrivait de Suisse avec une excellente préparation de pharmacologue. Ce que furent les mois d'une telle collaboration, rien ne put l'égaler si ce n'est la participation aux premiers essais du Sulfamide sur les malades de l'Hôpital de l'Institut Pasteur avec le Docteur

René Martin, médecin-chef de cet hôpital. Un petit garçon, atteint de méningite cérébro-spinale, maladie mortelle dans 95% des cas, était arrivé dans le coma. René Martin le traita avec le Sulfamide et le lendemain, il était toujours vivant. Dans l'ignorance de la toxicité possible du produit, les doses données durant les jours suivants, étaient justes suffisantes pour prolonger l'existence menacée... Un peu plus d'audace permit, après 20 jours d'essais trop timides, d'obtenir la guérison; ce jeune garçon est maintenant père de famille et il exerce avec foi son métier de médecin.

Au cours de ces années de passionnantes recherches j'avais acquis la certitude de l'utilité de l'interpénétration des sciences. N'étant, de formation, que chimistes, nous avions repris, ma femme et moi, à un âge où nous aurions pu professer, une certaine activité d'étudiants en préparant à la Sorbonne les certificats de Physiologie et de Biologie générales: c'est certainement ce qui nous a permis de participer plus intensément aux essais de Nitti et de Bovet. Je me souviens d'avoir été alerté au Cours de physiologie végétale, par l'étude des auxines, facteurs de croissance et d'avoir pressenti le rôle que pourrait peut-être jouer le sulfamide comme antifacteur de croissance. Bovet prouva, à l'aide d'une moisissure, l'Aspergillus niger, que le développement de cette moisissure était réellement stoppé par le Sulfamide, stoppé mais non définitivement arrêté: il ne s'agissait plus d'une action antiseptique, mais bien empêchante, processus nouveau d'activité antibiotique. Chez l'animal, les défenses naturelles de l'organisme achèvent l'œuvre de destruction d'un ennemi affaibli par l'action du Sulfamide qui ne fait que suspendre son développement en l'empêchant d'utiliser les facteurs de croissance habituels; les bases des relations entre métabolites et antimétabolites devaient bientôt être clarifiées de magistrale façon, en Angleterre, par Woods et Fildes.

Les années 1939–1940 devaient avoir naturellement de fortes répercussions au Laboratoire. Le traitement local des blessés de guerre par la poudre de Sulfamide en mit en lumière une nouvelle propriété. Le Professeur Legroux, de l'Institut Pasteur et le Docteur Jean Gosset, les premiers, déployèrent tout leur zèle à entraîner l'Académie de Chirurgie dans une étude aussi fructueuse qu'éphémère puisque ce fut l'exode de juin 1940.

Au retour, le destin de l'Institut Pasteur était hésitant. Probablement parce que le Sulfamide jouissait alors d'une assez large audience dans le monde scientifique, ce destin me fut confié par Monsieur Pasteur Vallery-Radot et le Conseil d'Administration; j'avais accepté, autant par amour de cette Maison que par le désir de la préserver contre l'occupant.

J'avais conservé l'illusion, bientôt décroissante, de poursuivre parallèlement mes propres travaux... et là se pose l'insoluble problème du choix d'un Directeur d'Institut de recherches. Sa stérilisation est à peu près inéluctable – par ailleurs qui, mieux qu'un chercheur, peut comprendre les problèmes d'autres chercheurs? Durant mes 23 années de Direction mes objectifs ont été d'accueillir les compétences éventuelles, de procurer le maximum de moyens de travail à tous mais de leur donner la possibilité de faire leurs preuves avec la plus grande liberté possible; j'ai tenté de les laisser travailler dans la confiance et l'amour du métier qui m'avaient donné des ailes pendant 20 ans. Evidemment, tous n'ont pas réagi de la même façon: si le feu sacré supplée à bien des choses, on ne peut négliger l'apport d'honnêtes travailleurs que le concours d'un matériel de plus en plus perfectionné autorise à jouer leur rôle avec efficacité. Les moyens de travail atteignent maintenant une ampleur qui permet de concevoir la formation d'équipes au sein desquelles chacun apporte une contribution diverse et complémentaire: voici l'un des résultats nouveaux et fort désirables de l'aide grandissante qu'apportent les autorités compétentes à la marche de la recherche scientifique: suppléer à l'insuffisance de l'imagination créatrice.

Le grand réaliste qu'est LOUIS ARMAND écrivait: «que la technique ne se contente plus, comme dans le schéma classique, d'appliquer les découvertes scientifiques: elle les provoque, les sollicite en utilisant des phénomènes avant même qu'ils soient compris et en défrichant ainsi, par des recherches que nécessitent ses propres besoins, certains domaines où elle ouvre les voies à la science.»

Par ailleurs, il est bien évident que l'intérêt primordial du développement des moyens de travail reste de simplifier la tâche du chercheur de génie, d'économiser le temps d'exécution de ses idées en favorisant ainsi l'extension de sa pensée.

J'ai bien le sentiment que nous approchons de l'équilibre qui permettra à l'avenir de consolider les bases que nous ont donné des hommes hors de pair tels que PASTEUR, les CURIE, NIELS BOHR, DE BROGLIE et tant d'autres plus obscurs mais dont le mérite sera certainement reconnu en d'autres temps.

English translation of the Conference Lecture given by
Prof. J. TRÉFOUËL

THOUGHTS ON SCIENTIFIC RESEARCH

Out of an article written in 1935 by LECOMTE DU NOUY in which he mentioned the unbelievable financial difficulties still hampering scientists I draw these few lines:

"One thinks a man who devotes himself to Science loves his métier and is entertained by his work; we might see there a sort of revenge from all those who are bored with their work."

After 30 years what a wonderful reversal of the situation and what sort of an echo has been brought about in the minds of those in charge of the destinies of scientific research by the previous lines.

The prime part of Science has grown out gradually into an extraordinary obviousness: for instance, in atomic physics, protein chemistry, synthesis of amino-acids, macromolecular studies, cybernetics, the achievements noticed are amazing. And what to say about that we see every day without wondering, with a confidence in science growing to the utmost. Man moves in the cosmos, discerns the inner structure of a virus by means of the electron microscope, extends the transmutation of metals, cures diseases thought as incurable, and finally follows in PARACELSE's footsteps, the father of hermetic medicine.

Trained minds have achieved these feats, thanks to the keenness of their perception and to unexpected financial supports. By now, these supports have been definitely secured: industrial and laboratory equipment has been improved; research workers are looked after from the time they start school until, strong with their new knowledge, they step into the temple of their future career. These privileged people of to-day will find there the practical means to solve, at once, problems that would have taken days of work but a few years ago.

And at this point arises the major question: Shall this financial ease free them from secondary problems, allowing them to ponder without restraint and to broaden the scope of their thoughts? Or on the other hand won't it slow down their attention or their understanding.

I cannot withstand the temptation to compare two quotations, the former from these same pages from LECOMTE DU NOUY, the latter from an article by MAURICE PONTE in the C.S.F. review.

The former recalls: "The unforgettable hours spent in the laboratory, face to face with the instrument we have often imagined ourselves on that special purpose, watching with a beating heart. When the instrument gives us the answer we are waiting for, then we realize that a victory has been obtained by the Mind on a mysterious and deceiving Matter at last forced to surrender.

Every scientist must have felt elevated by the same emotion, or then he is no searcher. In all creative career a sentimental, affective component has to be present. In the course of an experiment, when we are obliged to create or to perfect a mean of observation or measurement, we are quite sure that we should meet new facts which will become the origin of new investigations, if we want it."

I quoted such a long passage from LECOMTE DU NOUY's book because each of the ideas he expressed agrees with those which overwhelmed me from the beginning of my scientific career until this very instant when my twofold career of scientist and then of Director of a Research Institute allows me to stop and consider.

But beforehand, I feel it is interesting to quote a remarkable passage from MAURICE PONTE, an antithesis to the previous lines but only to strengthen their meaning: "In the United States, where money for research is not lacking, the big Laboratories are quickly overequipped. In a chemistry laboratory, a student was operating a fractional distillation apparatus. The fractionating column was hidden and the different fractions gathered automatically. Thus, the student had nothing to do, he had overlooked the phenomenon. . . . Knowledge had been destroyed by Technology."

I don't mean we must suppress technology in the laboratory and that we have to come back to scarcity which was the lot of research till now. That would be impossible. I mean only that overtechnicity may be dangerous for the searcher and that he has to be careful and keep whole his intellectual faculties.

Don't imagine that, after having praised the increase in money for science, I am at least regretful of these circumstances enabling us to compete on equal terms with foreign countries, and representing the unescapable and most desirable trend in our research. But, having obtained these opportunities enabling the majority of workers to get an unexpected yield, we must still keep on watch, in order to find young, inventive, passionate minds able to draw out of their very self the secrets of wonderment and the revelation of creative ideas. Professor MONTEL was more than witty when he exclaimed: "Of course, we need researchers, many researchers, but couldn't we also have discoverers?"

To them, easily known to a real chief by the flame in their eyes, the liveliness of their answers, their eagerness to proceed with an experiment regardless of time, to them, we must, with regards, give freedom of thought and action.

Of course, a working hypothesis, a plan for experiments, are necessary. But it must be understood that a real searcher cannot be a slave by this planning, that his mind must remain free, ready to catch everything.

It is not always a matter of genius like in the case of LOUIS PASTEUR; is it possible to forget the day when, seeing chicken insensitive to inoculations of *weakened* cholera cultures and then to virulent ones otherwise deadly, PASTEUR exclaimed: "they are vaccinated."

As fruitful discovering processes exist, and the example of the manner in which the properties of penicillin were brought is a great lesson. In the brilliant ALMOTH WRIGHT's Laboratory, FLEMING "did his daily work ever ready to expect the unexpected and to measure its importance" (ANDRÉ MAUROIS). Thus, the Petri boxes where he grew his microbe cultures were always kept long enough to assert their long term behaviour, for FLEMING

was actually haunted by a dream, judged Utopian by scientists like BEHRING and ALMOTH WRIGHT himself: to find a substance selectively pathogenic to bacteria, i.e. able to kill them without destroying the life of the host cells. Lysozyme and Penicillin proved he was right. The discovery of the former is a consecration of a methodic mind: FLEMING, having caught a cold, put some of his nasal mucus on a Petri box: he soon noticed that, around this point, the bacteria cultures did not develop. There was therefore an active substance in the nasal mucus; he called it Lysozyme and found it also in tears, milk, egg-white.

Its bacteriological power was weak, limited, but the dream was coming to reality and FLEMING was ready to make the second observation that most bacteriologists would not have made: an air moisture, a penicillium, fallen into a Petri box already inoculated, stopped bacterial evolution at the spots where it developed . . . what astonishing properties should have the secretion product of the penicillium? . . . FLEMING called it Penicillin but he was no chemist so he could not isolate, concentrate, purify neither lysozyme nor penicillin.

In New York, in 1939, I met FLEMING at the International Congress of Microbiology almost entirely devoted to the achievements of Sulphamides. He told me how much the papers presented strengthened his faith in the possibilities of his own discoveries, though they had arisen no interest for ten years. With a renewed eagerness, he sought the scientists able to tackle this problem, solved at last by this great chemist, ERNST CHAIN. In 1944, when England was not yet at peace, I went to Oxford and visited the institute directed by Sir HOWARD FLOREY and I saw a very moving spectacle: Penicillin being first prepared. It was not possible to take away equipment from the war-factories, and FLOREY and CHAIN's laboratory only had milk cans, central heating pipes, bathtubs and decanting vessels. But enthusiasm made up for everything: penicillin was ready for medical uses which were, for the second time, to settle the victory of antibacterial means and to put chemio-therapy in partnership with serum-therapy and vaccine-therapy. This exciting pioneering work was to be followed by practical achievements increasing every year; the Industrial preparation of penicillin became world-spread. This extent had another consequence; it made soon possible the study and the preparation of antibiotics the number and use of which seem almost unlimited. What a unique reward for the gift of observation and the passion for work of these three scientists: FLEMING, FLOREY, CHAIN. A joint NOBEL prize was to crown the joint effort they made under the most humble circumstances.

Many other examples could be given: the striking simplicity of some discoveries is oddly outpassed by the services they render. I have in mind the case of bacteriophagi the size of which could only be known by ultrafiltration and ultracentrifugation. One of the heads of the Pasteur Institute, PIERRE NICOLLE, showed that there exists a connection between the size of bacteriophagi and their sensitivity to rubbing. With the sole help of a "spreader" (a bent glass rod having a rubbing length of 1 cm) he swept over the gelose containing the bacteriophagi culture, NICOLLE noticed that the smaller bacteriophagi were not affected while the bigger ones were very sensitive: thus he classified easily bacteriophagi according to their size and pointed out an interesting relationship with WOLLMAN and LACASSAGNE's results on the connection between the size of the bacteriophagi and their sensitivity to radiation.

A while ago, I threatened you to illustrate my talk with the twofold experience of my career as a chemist and then as the Director of the Pasteur Institute. Allow me to recall very plainly my joys as a searcher; they owe much more to the extraordinary atmosphere in which my researches were

made than to the weak support granted to them. Monsieur Roux, the Director at that time would have given us anything and that is probably why we had some restraint in drawing out money we knew to be scarce. To us, much more worthy was the friendship that Monsieur Roux, a bacteriologist fond of chemistry showed us; calling on him, each time our research made a step further meant to us a purpose and a new impulse.

Thanks to Madame Ramart, Organic Chemistry Professor at the Sorbonne, I entered the Pasteur Institute and never will I be grateful enough for her having understood my right place could be there.

I had the great luck to find at the "Laboratoire de Chimie Thérapeutique" the Ideal Research Director. Ernest Fourneau's intelligence dazzled everyone; it overwhelmed me as soon as we first met and catalyzed my research dreams. Out of a few minute's exchange of ideas with him, sprang a thousand possibilities for new work. But Ernest Fourneau had another talent: he knew how to give his co-workers enough freedom in the handling of their research so that their choice was an interesting subject in itself. He hinted I should resume the study of the aminophenylarsonic acids which Ehrlich had given up for that of arsenobenzenes, of the 606 or 914 type, which had achieved a great success in the treatment of syphilis. We could soon notice that the corresponding acetylamino-acid, the 190 F or Stovarsol, was in fact very interesting: against the ternary syphilis its results were at least equivalent to those obtained by malaria therapy, a kill-or-cure remedy: its consequences had afterwards to be fought. My wife and I were thrilled by the preparation of the 10 isomers of the 190 F and by their compared tests for syphilis which Levaditi undertook on rabbits and for sleeping-sickness which Mesnil experimentally studied on mice; this test was profitable in three ways: low cost of the animal, minute amount of medicine needed, speed of results: such is the reproducibility of the sickness that within a few hours, you can make out whether the action is partial or total. But, Mesnil's Laboratory was rue Falguière and ours rue Dutot; we thought everything would be easier and more exciting, should it be possible to follow the tested mice constantly and thus guide our chemistry work. Mesnil agreed to assign us his assistant, a charming Spaniard, Navarro Martin who settled down in a room at the chemistry laboratory; this intimate work together remains one of my best memories: as soon as one of our syntheses was over, Navarro injected the product to an inoculated mouse the blood of which showed 5 to 10 trypanosomes in the microscope field; how eagerly he scrutinized the tiny drop of blood taken from the mouse's tail, day after day, sometimes hour after hour, in order to follow the possible vanishing of the trypanosomes. . . . Thus, we soon could isolate a Stovarsol isomer, the one called Orsanine when it became used for man; it achieved on the mouse results much greater than the nine other isomers. Oddly enough, the curative properties of Stovarsol and Orsanine turned out to be opposite: the superiority of the former in syphilis and that of the latter in sleeping-sickness met with totally different physical and physiological properties; the position of the chemical groups on the phenyl ring was more important than their very nature. To-day, this result seems obvious because of the increased development in molecular models; however at that time, it was a very useful guide throughout our next work, thence set upon the idea that a given molecule acted specifically.

A new illustration came on with the study of a series of complex ureas, always for sleeping-sickness. The purpose was to find out the structure, kept secret by the Germans, of their 205-Bayer, a product of such an efficiency that they had contemplated the transfer of Cameroun in exchange of its structure. Ernest Fourneau, who read German as well as French, had an inkling of the chemical series to which the 205 should belong. He

asked my wife, Jean Vallée and myself to tackle this problem. Nine hard-working months allowed us to discover, one day, that one of the 200 compounds with related formulas we had prepared had a striking action on mice: 3 micrograms of this compound, 309 F, cured them while 12 milligrams weren't yet deadly; this unbelievable ratio led us to think that our 309 was Bayer's 205 itself (the publication of our results brought us a visit from the horrified Director of Bayer's who convinced us that he would have paid a great deal for our silence). As striking was the specificity of this compound with its molecular weight greater than 1400: we had only to change the position of a methyl group to annihilate its curative action.

When Domagk published the action of Prontosil on bacteria, we were going to undertake the study of this molecule until it would yield the secret of its activity. Prontosil, an azoïc dye, does not owe its medical activity to the dye function but only to one of its cleavage products: the sulphamide. This result pleased us even more because it gave credit to our confidence in the existence of relationships between chemical structure and medical activity: facts were in good agreement with theory. Prontosil consists of two phenyl rings one of which is substituted by a sulphamide function. Modifying this ring cancelled antibacterial action, while modifying the other one had no effect. We drew the conclusion that this last ring was of no interest and we prepared the p. Aminophenylsulphamide or "Sulphamide" and noticed that this plane, colorless molecule was in fact the active part of Prontosil.

Experiments on animals were carried out with the help of two very dear friends: Nitti, a bacteriologist of Salimbeni's laboratory at the Pasteur Institute, and Bovet, coming from Switzerland with an excellent training in pharmacology. This few month's collaboration can be compared to nothing but my share in the first testings of sulphamide on the patients at the Pasteur Institute Hospital with Doctor René Martin, the head doctor of this hospital. A little boy with a cerebro-spinal meningitis, a 95% fatal illness, was brought in coma. René Martin treated him with the Sulphamide, and the day after he was still alive. Not knowing the possible toxicity of the product, the doses we gave him in the following days were only sufficient to keep him alive. After 20 days of too shy tests, a little more boldness enabled us to obtain the cure; this boy has become now a father and is a faithful doctor.

During these exciting years, I learnt with certainty how useful an interpenetration of scientific branches is. Being only chemists, my wife and I resumed a new student life by preparing for degrees in General Physiology and Biology at the Sorbonne, though we were of teaching age: probably these efforts allowed us to take a greater share in Nitti and Bovet's tests. I remember I was struck, during vegetal physiology lectures, by the effect of auxines as factor of growth, and I had an inkling of the part the sulphamide might play as an antigrowth factor. With the help of Aspergillus niger, Bovet established that the growth of this mould was actually stopped but not definitely. It was no longer an antiseptic activity but a real hindrance, a new process in antibiotic activity. For an animal, natural protections in its system end the destruction process of an enemy already weakened by the Sulphamide the action of which only tends to stop its development by preventing it from using its usual growth factors; the connection basis between metabolites and antimetabolites were soon to be masterfully unfolded by Woods and Fildes in England.

Of course, the years 1939 and 1940 were to be of great influence on the laboratory. The local treatment of wounded by the Sulphamide powder brought to light a new property for it. Professor Legroux at the Pasteur Institute and Doctor Jean Gosset, were the first to display much eagerness

in leading the Surgery Academy into a study as fruitful as it was shortlived since it was June 1940 exodus.

At our return, the fate of the Pasteur Institute was unsettled. Probably because of the Sulphamide fame in the scientific world, the charge of the Institute was handed over to me by Pasteur Vallery-Radot and the board of directors. I accepted as much for this house's sake as for the desire to protect it against the occupying forces.

I had kept the illusion soon decreasing to go on with my own work at the same time . . . and there is the unsolvable problem of the choice of a Research Institute Director—his sterilization is unavoidable—besides, who more than a searcher can best understand other searchers problems ? During my 23 directing years, my aims were to welcome occurring skills, to provide for everybody the best working means and to give them the possibility to prove themselves with the greatest freedom; I tried to let them work in the confidence in and love of the métier which had lent me wings during 20 years. Obviously, everyone did not react the same: if sacred fire makes up for many things, we cannot minimize the contribution of honest workers whose part was made more efficient with the help of an equipment increasingly improved. The working means are now so great that they allow to imagine the formation of teams in which everyone brings a different and complementary share. This is a new and very suitable result for the growing help that proper authorities bring to the advance of scientific research: to make up for the lack of creative power.

This great realist Louis Armand wrote: "Technology does no longer follow Science it goes ahead taking advantage of facts before they are theoretically understood, and owing to its own needs, clears new ways for Science."

In addition, the obvious interest of improving the means of work is to simplify the work of the genius, to shorten the time required for the execution of his ideas thereby favouring the spreading of his discoveries.

I feel quite certain that we are approaching a state of equilibrium which will allow us to strengthen the foundations laid down by unrivalled men like Pasteur, the Curies, Niels Bohr, de Broglie and so many others somewhat less famous, but whose merit will certainly be acknowledged in the future.

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Apdo. postal 18875, Cipres 176, México 4 D. F.

Netherlands Dr. W. F. Haak, Chemical Council of the Netherlands
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Burnierstraat 1, The Hague

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2101 Constitution Avenue, Washington 20418, D.C.

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CSIRO, Chemical Research Laboratories
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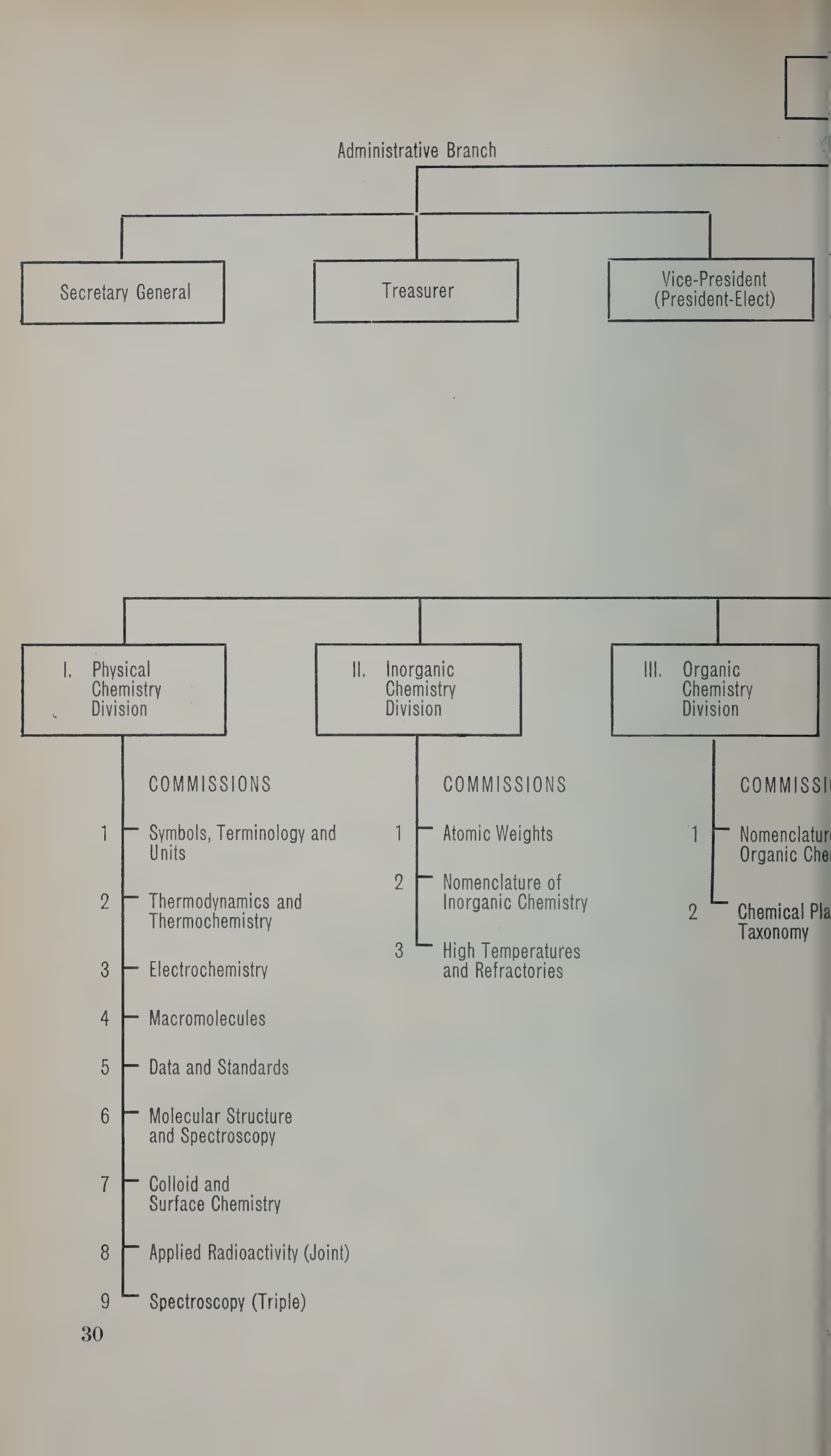
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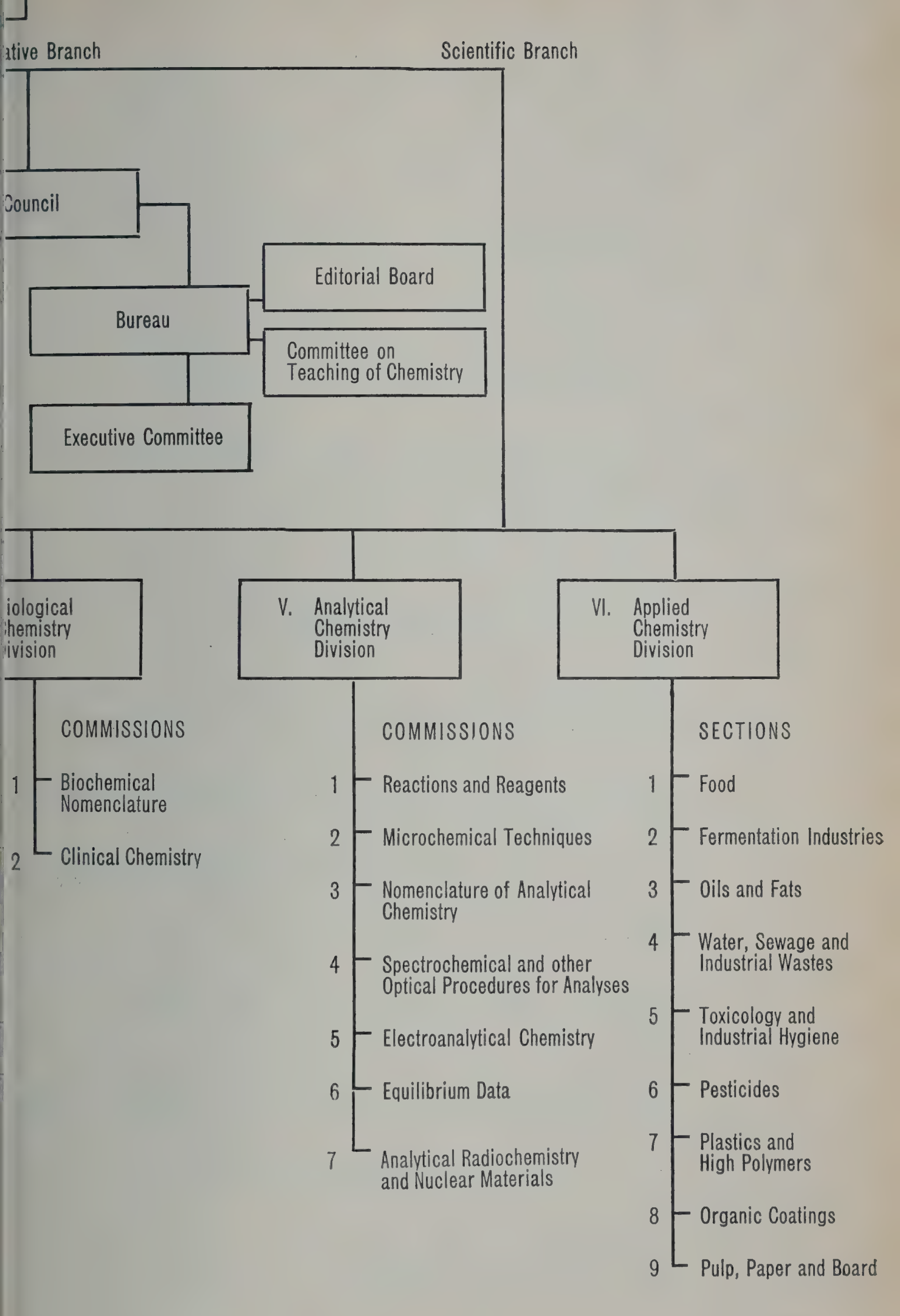
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Leninskii Prospekt 31, Moscow V-71 (USSR)

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Van't Hoff Laboratory of Physical Chemistry,
The University of Utrecht,
Sterrenbos 19, Utrecht (Netherlands)

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Institut de Recherches sur la Catalyse
30, bd de l'Hippodrome, Villeurbanne, Rhône (France)

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Department of Chemistry, University of Manchester
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Washington DC, 20234 (USA)

1963–1967 JAENICKE, W., Prof.
Institut für Physikalische Chemie der Universität Erlangen-Nürnberg
Schuhstr. 19, 8520 Erlangen (Germany)

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Royal Danish Agricultural and Veterinary School
Bülowsvej 13, Copenhagen (Denmark)

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Laboratorium voor Structuur Chemie, der Rijks Universität
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Dir., Institut für Physikalische Chemie und Elektrochemie der Technischen Hochschule
Engelstr. 11, Karlsruhe (Deutschland)

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Institute of High Temperature
Krasnokazazmennay 17/2, Moscow E-250 (USSR)

HUBBARD, W.N., Dr.
Argonne National Lab., Chemical Engineering Division
9700 S Cass Avenue, Argonne, Illinois (USA)

McGLASHAN, M.L., Prof.
Dept. of Physical Chemistry
Exeter University, Exeter Devon (UK)

MURGULESCU, I., Prof.
Centrul de Certetari Chimice al Academiei R.P.R.
Str. Dumbrava Rosie 23, Bucuresti (Rumania)

NEWITT, D.M., Prof.
Department of Chemical Eng.
Imperial College of Science and Technology, London SW 7 (UK)

SCHAEFER, Kl., Prof.
Institut für Physikalische Chemie der Universität Heidelberg
Tiergartenstrasse, Heidelberg (Germany)

TANAKA, N., Prof.
Department of Chemistry, Faculty of Science
Tohoku University, Sendai (Japan)

VODAR, B., Prof.
Laboratoire des Hautes Pressions
1, place Aristide-Briand, Bellevue (S.-et-O.) (France)

WADDINGTON, G., Dr.
Office of Critical Tables
National Academy of Sciences, National Research Council
2101 Constitution Avenue, Washington, DC, 20418 (USA)

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Avenue de l'Orée, Bruxelles 5a (Belgium)

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Lehrstuhl für Elektrochemie, Technische Hochschule
Engelerstrasse 11, Karlsruhe (Germany)

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Ecole de physique et de chimie
10, rue Vauquelin, Paris 5e (France)

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National Bureau of Standards
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Whitemore Lab., Pennsylvania State University
University Park, Pa., 16802 (USA)

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Institut für Physikalische Chemie, Universität Erlangen
Schuhstrasse 19 Erlangen, (Germany)

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Laboratoire d'Electrolyse du CNRS
1, place Aristide-Briand, Bellevue (S.-et-O.) (France)

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Laboratori di Chimica, Istituto superiore di Sanità
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Istituto de Química-Física «Rocasolano», Universidad de Madrid
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Polytechnic Institute of Brooklyn
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Währingerstrasse 42, Wien IX (Austria)

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Istituto di Chimica industriale del Politecnico
Piazza Leonardo da Vinci 32, Milano (Italy)

STAVERMAN, A.J., Prof., Central Laboratory TNO
132 Julianalaan, P.O. Box 71, Delft (Netherlands)

TURSKA, E., Prof.
Department of Physical Chemistry of High Polymers
Polytechnic Institute of Lodz
Zwirki 36, Lodz (Poland)

WILLIAMS, H.L., Dr.
Research and Development Division, Polymer Corporation Ltd.
Sarnia, Ontario (Canada)

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Belgium	DESREUX, V., Prof. Université de Liège, Laboratoire de Chimie physique 2, rue A.-Stevart, Liège
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USSR	KARGIN, V.A., Prof. Academy of Sciences of USSR Leninskii prospekt 14, Moscow V-71

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Commission: Données et Étalons physico-chimiques

Titular members

Chairman

1963–1967 Staveley, L.A.K., Dr.
Inorganic Chemistry Laboratory, University of Oxford
Oxford (UK)

Vice-chairman and Secretary

1959–1967 Smit, W.M., Dr.
Institute for Physical Chemistry TNO
Croesestraat 77A, Utrecht (Netherlands)

Members

1965–1969 Brown, I., Dr.
Division of Physical Chemistry, Chemical Research Laboratories CSIRO
Box 4331, G.P.O., Melbourne (Australia)

1963–1967 Herington, E.F.G., Dr.
National Chemical Laboratory
Teddington (UK)

1963–1967 Kienitz, H., Dr.
Badische Anilin- und Sodafabrik AG, Analytisches Labor
Ludwigshafen am Rhein (Germany)

1965–1969 Meinke, W.W., Dr.
Division of Analytical Chemistry, National Bureau of Standards
Washington, DC, 20234 (USA)

1961–1969 Plebanski, Th., Dr.
Main Office of Measures,
Ul. Elektoralna 2. Warszawa (Poland)

1963–1967 Stull, D., Dr.
Thermal Research Laboratory, Dow Chemical Company
Midland, Mich. (USA)

Associate Members

Mashiko, Y., Dr.
The Government Chemical-Industrial Research Institute of Tokyo,
1-chome, Honmachi, Shibuya-ku, Tokyo (Japan)

Saylor, Ch.P., Dr.
National Bureau of Standards
Washington 25, DC, 20234 (USA)

Sunner, S., Dr.
Thermochemistry Laboratory University of Lund
Tornavägen 13, Lund (Sweden)

Wibaut, J.P., Prof.
Soerenseweg 125, "Arendsburght" flat 81
Apeldoorn (Netherlands)

National Representatives

Canada — GRAHAM, R. P., Dr.
Department of Chemistry, McMaster University
Hamilton, Ontario

France — TERRIEN, J., Dr.
Bureau international des Poids et Mesures
Sèvres (S.-et-O.)

Germany — FEUERBERG, H., Dipl.-Chem.
Physikalisch-Technische Bundesanstalt
Bundesallee 100, 33 Braunschweig

India — MUKHERJEE, J.N., Dr.
10 Puran Chand Nahar Avenue
Calcutta-13

Italy — MILONE, M., Prof.
Director Chemical University
Corso Massimo d'Azeglio 48, Torino

I.6 Commission: Molecular Structure and Spectroscopy
Commission: Structure moléculaire et Spectroscopie

Titular members

Chairman

1961–1967 LORD, R.C., Prof.
Spectroscopy Laboratory, Massachussetts Institute of Technology
Cambridge 39, Mass. (USA)

Secretary

1961–1967 JONES, R.N., Dr.
Division of Pure Chemistry, National Research Council of Canada
Sussex Drive, Ottawa 2, (Canada)

Members

1965–1967 COLE, A.R.H., Prof.
School of Chemistry, University of Western Australia
Nedlands (Australia)

1965–1967 FÖRSTER, Th., Prof.
Institut für physikalische Chemie der Technischen Hochschule
Wiederholdstrasse, Stuttgart (Germany)

1965–1967 MORINO, Y., Prof.
Department of Chemistry, Faculty of Science, University of Tokyo
Tokyo (Japan)

1957–1967 THOMPSON, H.W., Prof.
St. John's College, Oxford (UK)

Associate Members

Lecomte, J., Prof.
Laboratoire de Recherches physiques
1, rue Victor-Cousin, Paris 5e (France)

Mecke, R., Prof.
Institut für Elektrowerkstoffe
Eckerstrasse 4, Freiburg i. Br. (Germany)

Mizushima, S., Prof.
698, 2-chrome, Tamagawa-Denenchofu
Setagaya-ku, Tokyo (Japan)

Pliva, J., Dr.
Chemical Institute, Czechoslovak Academy of Science
Machova 7, Prague 2, Vinohrady (Czechoslovakia)

Terenin, A.N., Prof.
Institute of Physics, The University
Leningrad B-164 (USSR)

Vodar, B., Prof.
Laboratoire des Hautes Pressions, Centre national de la Recherche scientifique
1, place Aristide-Briand, Bellevue (S.-O.) (France)

Advisory Councellor

Herzberg, G., Dr.
Department of Pure Physics, National Research Council of Canada
Sussex Drive, Ottawa 2 (Canada)

National Representative

Poland Urbanski, T., Prof.
Politechnika, 75, rue Koszykova, Warsaw 10

Observer

Brattain, R.R., Dr.
1 White Oak Drive, Lafayette, California (USA)

I.6.1 Sub-Commission: Infrared and Raman Spectroscopy
Sous-Commission: Spectroscopie infrarouge et Raman

Chairman

Lord, R.C., Prof.
Spectroscopy Laboratory, Massachussetts Institute of Technology
Cambridge 39, Mass. (USA)

Members

Cole, A.R.H., Prof.
School of Chemistry, University of Western Australia
Nedlands (Australia)

CRAWFORD, B.L., Jr., Prof.
Department of Chemistry, University of Minnesota
Minneapolis 14, Minn. (USA)

DUPEYRAT, R., Prof.
Laboratoire des Recherches physiques
1, rue Victor-Cousin, Paris 5e (France)

HADNI, A., Prof.
Départment de Chimie, Université de Nancy
Nancy (France)

JONES, R.N., Dr.
Division of Pure Chemistry, National Research Council of Canada
Sussex Drive, Ottawa 2, (Canada)

MILLS, I.M., Dr.
Department of Chemistry, University of Reading
Reading (UK)

STOICHEFF, B.P., Prof.
Department of Physics, University of Toronto
Toronto (Canada)

WILKINSON, G.R., Dr.
Department of Physics, King's College
Strand, London WC 2 (UK)

I.6.2 Sub-Commission: Ultraviolet Spectroscopy
Sous-Commission: Spectroscopie ultraviolette

Chairman

FÖRSTER, TH., Prof.
Institut für physikalische Chemie der Technischen Hochschule
Wiederholdstrasse, Stuttgart (Germany)

Members

BRATTAIN, R.R.
1 White Oak Drive, Lafayette, California (USA)

CALLOMON, J.H., Dr.
Department of Chemistry, University College
London (UK)

JONES, R.N., Dr.
Division of Pure Chemistry, National Research Council of Canada
Sussex Drive, Ottawa 2 (Canada)

NAGAKURA, S., Prof.
Institute for the Study of Solid State Physics, Tokyo University, Azabu
Tokyo (Japan)

VODAR, B., Prof.
Laboratoire des Hautes Pressions, Centre national de la Recherche scientifique
1, place Aristide-Briand, Bellevue (S.-et-O.) (France)

I.6.3 Sub-Commission: Storage and Retrieval of Spectroscopic Data

Sous-Commission: Recueil et Contrôle des Données spectroscopiques

Chairman

JONES, R.N., Dr.
Division of Pure Chemistry, National Research Council of Canada
Sussex Drive, Ottawa 2 (Canada)

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KUENTZEL, L.E., Dr.
Wyandotte Chemicals Corporation
Wyandotte, Mich. (USA)

SAVITZKY, A., Dr.
The Perkin-Elmer Corporation
Norwalk, Conn. (USA)

SHIMANOUCHI, T., Prof.
Department of Chemistry, Faculty of Science, The University of Tokyo
Tokyo (Japan)

THOMPSON, H.W., Prof.
St. John's College, Oxford (UK)

I.6.4 Sub-Commission: Units and Terminology

Sous-Commission: Unités et Terminologie

Chairman

HERZBERG, G., Dr.
Division of Pure Physics, National Research Council of Canada
Sussex Drive, Ottawa 2, (Canada)

Members

LECOMTE, J., Prof.
Laboratoire des Recherches physiques
1, rue Victor-Cousin, Paris 5e (France)

MECKE, R., Prof.
Institut für Elektrowerkstoffe
Eckerstrasse 4, Freiburg i. Br. (Germany)

MORINO, Y., Prof.
Department of Chemistry, Faculty of Sciene, The University of Tokyo
Tokyo (Japan)

TERENIN, A.N., Prof.
Institute of Physics, the University
Leningrad B-164 (USSR)

I.7 Commission: Colloid and Surface Chemistry
Commission: Chimie des Colloïdes et des Surfaces

Titular Members

Chairman

1961–1967 RIDEAL, Sir Eric K., Prof. emeritus
Royal College of Sciences, Department of Chemistry
Imperial Institute Road, London SW 7 (UK)

Vice-Chairman

1965–1969 OVERBEEK, J. TH. G., Prof.
Van't Hoff Laboratory of Physical Chemistry, University of Utrecht
Sterrenbos 19, Utrecht (The Netherlands)

Secretary

1962–1969 ZISMAN, W. A., Dr.
U.S. Naval Research Laboratory Chemistry Division
Washington, DC, 20390 (USA)

Members

1961–1969 DUBININ, M. M., Academician
Institute of Physical Chemistry, Academy of Sciences
Moscow (USSR)

1965–1969 EVERETT, D.C., Prof.
Department of Physical and Inorganic Chemistry, University of Bristol, Bristol (UK)

1961–1969 HORIUTI, J., Prof.
Research Institute for Catalysis, Hokkaido University
Sapporo (Japan)

1961–1969 KAMIENSKI, B., Prof.
Krakow University
23 Karlowicza Krakow (Poland)

1965–1969 PRETTRE, M., Prof.
Institute de Recherches sur la Catalyse
30, bd de l'Hippodrome, Villeurbanne, Rhône (France)

1.8 Joint Commission: Applied Radioactivity
Commission mixte: Radioactivité appliquée

Chairman

IUPAC 1959–1967 — SELIGMAN, H., Dr.
International Atomic Energy Agency
Kärntnerring, Vienna (Austria)

Secretary

IUPAC 1959–1967 — FISHER, C.,
Commissariat à l'Energie Atomique
Centre d'Etudes Nucléaires de Saclay
Boîte Postale n° 2, Gif-sur-Yvette (S.-et-O.) (France)

Members

IUPAP — ALLISY, A.,
Bureau international des Poids et Mesures
Pavillon de Breteuil, Sèvres (S.-et-O.) (France)

IUBS — CALVIN, M., Dr.
Deparment of Chemistry, University of California
Berkeley (USA)

IUPAP — ELLIOTT, L.G., Dr.
Atomic Energy of Canada Ltd.
Chalk River, Ont. (Canada)

IUPS — KEYNES, R.D., Dr.
Agricultural Research Council, Institute of Animal Physiology
at Babraham, Cambridge (UK)

IUPAC 1959–1967 — PEREY, M., Mlle, Prof.
Centre de Recherches Nucléaires
rue du Loess, Strasbourg-Cronenbourg (B.-Rh.) (France)

IUGG — PICCIOTTO, E., Dr.
Université Libre, 50, av. F.-D.-Roosevelt, Bruxelles 5 (Belgium)

IUBS — REICHARD, G.B.
Medicinsk-Kemiska Inst. Karolinska Institutet,
Solnavägen 1, Stockholm 60 (Sweden)

IUB — USSING, H.H., Prof.
Institute of Biological Chemistry, University of Copenhagen
2 A Øster Farimagsgade, Copenhagen K (Denmark)

Representative assistant

H. KAMEN, Prof.
University of California, La Jolla Cal. (USA)

I.9 Triple Commission: Spectroscopy
Commission triple: Sectroscopie

Chairman

IUPAC THOMPSON, H.W., Prof.
St. John's College, Oxford (UK)

Secretary

IUPAP PRICE, W.C., Prof.
Department of Physics, King's College, University of London
Strand, London, WC 2 (UK)

Members

IUPAC JONES, R.N., Dr.
Division of Pure Chemistry, National Research Council
Sussex Drive, Ottawa 2 (Canada)

IUPAP MANDELSTAM, S.L., Prof.
Lebedev Physical Institute, Moscow University
K-12 pr. Sapunova, Moscow 127 (USSR)

IAU MOORE, CHARLOTTE E., Dr.
National Bureau of Standards
Washington 25, DC (USA)

IUPAP NIELSEN, H.H., Prof.
Dept. of Physics and Astronomy, The Ohio State University
174 West 18th Street, Columbus 10, Ohio (USA)

IAU PHILLIPS, J.G., Prof.
Department of Astronomy, University of California
Berkeley 4, Cal. (USA)

INORGANIC CHEMISTRY DIVISION
DIVISION DE CHIMIE MINÉRALE

Division Committee / Comité de Division

Titular Members

President

1963–1967 DE BOER, J.H., Prof.
Scientific Council for Nuclear Affairs
Duinweg 24, P.O.B. 5086, The Hague (Netherlands)

Vice-President

1963–1967 BÉNARD, J., Prof.
Ecole nationale supérieure de Chimie
11, rue Pierre-Curie, Paris 5e (France)

Secretary

1959–1967 GUTMANN, V., Prof.
Technische Hochschule
Getreidemarkt 9, Vienna VI (Austria)

Members

1963–1967 ANDERSON, J.S., FRS, Prof.
University of Oxford, Inorganic Chemistry Laboratory
South Parks Road, Oxford (UK)

1965–1969 COLLONGUES, R., Prof.
Centre d'Etudes de Chimie metallurgique
15, rue Georges-Urbain, Vitry-sur-Seine (France)

1963–1967 GLEMSER, O., Prof.
Institut für Anorganische Chemie, Universität Göttingen
Hospitalstrasse 8–9, Göttingen (Germany)

1963–1967 PARRY, R.W., Prof.
Department of Chemistry, University of Michigan
Ann Arbour, Mich. (USA)

1965–1969 SARTORI, G., Prof.
Istituto di Chimica general e inorganica, Università di Roma
Citta Universitaria, Roma (Italy)

1963–1967 SCHWARZENBACH, G., Prof.
Institut für Anorganische Chemie, Eidg. Technische Hochschule
8000 Zürich (Switzerland)

1963–1967 SPITZYN, V.I., Prof.
Academy of Sciences, Moscow (USSR)

1963–1967 TRZEBIATOWSKA, B.J. (Mrs.) Prof.
Department of Chemistry, University of Wrocław
Wrocław (Poland)

II.1 Commission: Atomic Weights
Commission: Poids atomiques

Titular Members

Chairman

1963–1967 Wichers, E., Dr.
9601 Kingston Road, Kensington, Md. (USA)

Vice-Chairman

1963–1967 Ölander, A., Prof.
University of Stockholm
Kungstensgatan 45, Stockholm VA (Sweden)

Secretary

1959–1967 Guéron, J., Prof.
EURATOM
51–53, rue Belliard, Brussels 5 (Belgium)

Members

1959–1967 Cameron, A.E., Dr.
Oak Ridge National Laboratory
P.O.B. Y, Oak Ridge, Tenn. (USA)

1963–1967 Greenwood, N.N., Prof.
Department of Chemistry, University of Newcastle-on-Tyne
Newcastle-on-Tyne (UK)

1959–1967 Remy, H., Prof.
Chemisches Staatsinstitut
Jungiusstrasse 7–9, 2 Hamburg 36 (Germany)

1963–1967 Thode, H.G., Prof.
McMaster University
Hamilton/Ontario (Canada)

1963–1967 Wapstra, A.H., Prof.
Institut voor Kernenergie Onderzoek
Oosterringdyk 18, Amsterdam (Netherlands)

Associate Members

Batuecas, T., Prof.
Facultad de Sciencias, Universidad Santiago de Compostela (Spain)

Mattauch, J., Prof.
Max-Planck-Institut für Chemie
Saarstrasse 23, Mainz 65 (Germany)

Spaepen, J., Dr.
EURATOM Bureau of Nuclear Measurements
Steenweg op Retie, Geel (Belgium)

II.2 Commission: Nomenclature of Inorganic Chemistry
Commission: Nomenclature de Chimie inorganique

Titular Members

Chairman

1959–1969 JENSEN, K.A., Prof.
Kemisk Lab. II, H.C. Ørsted Inst.
Universitetsparken 5, Copenhagen Ø (Denmark)

Vice-Chairman

1959–1969 REMY, H., Prof.
Chemisches Staatsinstitut
Jungiusstrasse 7–9, 2 Hamburg 36 (Germany)

Secretaries

1959–1969 GALLAIS, F., Prof.
Centre National de la Recherche scientifique
15, quai Anatole-France, Paris 7e (France)

1963–1969 PRUE, J.E., Dr.
Department of Chemistry, The University of Reading, Berks. (UK)

Members

1963–1969 CHATT, J., Prof., F.R.S.
The Chemical Lab., University of Sussex
Falmer, Brighton (UK)

1959–1969 CHEESMAN, G.H., Dr.
Chemistry Department, University of Tasmania
G.P.O. Box 252 C, Hobart/Tasmania (Australia)

1959–1969 CRANE, E.J., Dr.
1325 Kingsgate Road, 21 Columbus Ohio (USA)

1963–1969 FERNELIUS, W.C., Dr.
Research Center, Koppers Co. Inc.,
440, College Park Drive, Monroeville, Pa. 15146 (USA)

1953–1969 MALATESTA, L., Prof.
Istituto di Chimica generale dell'Universita
Via Saldini 50, Milano (Italy)

1949–1969 ÖLANDER, A., Prof.
University of Stockholm
Kungstensgatan 45, Stockholm VA (Sweden)

Associate Members

BÉNARD, J., Prof.
Ecole nationale supérieure de Chimie
11, rue Pierre-Curie, Paris 5e (France)

FEITKNECHT, W., Prof.
Chemisches Institut der Universität
Freiestrasse 3, 3012 Berne (Switzerland)

KOTOWSKI, A., Dr.
Gmelin-Institut
Postschliessfach 13369, 6 Frankfurt a.M. W. 13 (Germany)

REES, A.L.G., Dr.
CSIRO Chemical Research Laboratories
Box 4331 G.P.O., Melbourne (Australia)

Corresponding Members

YAMASAKI, K., Prof.
Chemical Institute, Faculty of Science, Nagoya University
Chikusa, Nagoya (Japan)

Observer III.1

VEIBEL, S., Prof.
Department of Organic Chemistry, Technical University of Denmark
83, Sølvgade, Copenhagen K (Denmark)

II.2.1 Sub-Commission: Organic Derivatives of the Elements
Sous-Commission: Dérivés organiques des éléments

(jointly with the Commission on the Nomenclature of Organic Chemistry)

K.A. JENSEN	P.E. VERKADE
J. CHATT	K.L. LOENING
L. MALATESTA	N. LOZAC'H

II.3 Commission: High Temperatures and Refractories
Commission: Hautes Températures et Réfractaires

Titular Members

Chairman

1965–1967 NOWOTNY, H., Prof.
Physikalisch-Chemisches Institut der Universität Wien
Währingerstrasse 42, Vienna IX (Austria)

Secretary

1965–1967 COLLONGUES, R., Prof.
Centre d'Etudes de Chimie métallurgique
15, rue Georges-Urbain, Vitry-sur-Seine (France)

Members

1965–1967 FLOOD, H., Prof.
Inst. of Silicate Science, Norwegian Institute of Technology
Trondheim (Norway)

1965–1967 HORTON, W.S., Dr., National Bureau of Standards
Washington 25, DC, 20234 (USA)

Associate Members

BRIGHT, N.F.H., Dr.
Department of Mines and Technical Surveys
555, Booth Street, Ottawa (Canada)

CABANNES, F., Prof.
Laboratoire des Echanges thermiques
1, place Aristide-Briand, Bellevue (S.-et-O.) (France)

SCHAEFER, H., Prof.
Anorganisch-Chemisches Institut der Universität Münster
Hindenburgplatz 55, Münster (Germany)

WALKER, R.F., Dr.
National Bureau of Standards
Washington 25, DC, 20234 (USA)

III. ORGANIC CHEMISTRY DIVISION
DIVISION DE CHIMIE ORGANIQUE

Division Committee / Comité de Division

Titular Members

President

1965–1967 WEYGAND, F., Prof.
Org.-chem. Inst., Techn. Hochschule
Arcisstr. 21, 8 München 2 (Germany)

Past-President

1965–1967 MARION, L., Prof., Dean
Faculty of Science, University of Ottawa
Ottawa (Canada)

Vice-President

1965–1967 BARTLETT, P.D., Prof.
288, Concord Road, Weston 93, Mass. (USA)

Secretary

1965–1967 OURISSON, G., Prof.
Institut de chimie, Université de Strasbourg
Strasbourg (France)

Members

1963–1967 BARTON, D.H.R., Prof., F.R.S.
Department of Chemistry, Imperial College of Science
Imperial Institute Road, London SW 7 (UK)

1965–1969 HEROUT, V., Prof.
Institute of Organic Chemistry and Biochemistry
Flemings Square 2, Prague 6 (Czechoslovakia)

1961–1969 KJAER, A., Prof.
Department of Organic Chemistry
Den Kgl. Veterinaer- og Landbohojskole
Bülowsvej 13, Copenhagen V (Denmark)

1961–1969 NAKANISHI, K., Prof.
Department of Chemistry, Tohoku University
Katahira-cho, Sendai (Japan)

1963–1967 REUTOV, O.A., Prof.
Moscow University
Gorki Street 19, app. 72, Moscow (USSR)

1965–1969 ZOLLINGER, H., Prof.
Techn.-chem. Laboratorium, Eidg. Techn. Hochschule
8000 Zürich (Switzerland)

III.1 Commission: Nomenclature of Organic Chemistry
Commission: Nomenclature de Chimie organique

Titular Members

Chairman

1963–1967 VERKADE, P.E., Prof.
Ary Schefferstraat 217, The Hague (Netherlands)

Secretary

1963–1967 NUTTING, H.S., Dr.
1608 Crane Court
Midland, Mich. (USA)

Members

1965–1969 CROSS, L.C., Dr.
Editorial Office of the Chemical Society
20-21, Cornwall Terrace, Regent's Park, London NW 1 (UK)

1963–1967 DYSON, G.M., Dr.
49 Forestroad, Loughborough, Leicestershire (UK)

1963–1967 KERSAINT, G., Dr.
13, rue de l'Odéon, Paris 6e (France)

1965–1969 LOENING, K., Dr.
Chemical Abstracts Service, The Ohio State University
Columbus 10, Ohio (USA)

1963–1967 LOZAC'H, N., Prof.
Doyen de la Faculté des Sciences, Nouvelle Université
Caen (Calv.) (France)

1963–1967 VEIBEL, S., Prof.,
Department of Organic Chemistry
Technical University of Denmark
Sølvgade 83, Copenhagen K (Denmark)

Associate Members

CAHN, R.S., Dr.
23, Woodwaye, Oxhay, Watford Herts. (UK)

RIGAUDY, J., Prof.
Ecole de Chimie et de Physique
10, rue Vauquelin, Paris 5e (France)

III.2 Commission: Chemical Plant Taxonomy
Commission: Taxonomie chimique des plantes

Titular Members

Chairman

1965–1969 Marion, L., Prof., Dean
Faculty of Science, University of Ottawa
Ottawa (Canada)

Secretary

1965–1969 Swain, T., Dr.
Low Temperature Research Station
Downing Street, Cambridge (UK)

Members

1965–1969 Bate-Smith, E.C., Dr.
Low Temperature Research Station
Downing Street, Cambridge (UK)

1965–1969 Erdtmann, H., Prof.
Royal Institute of Technology
Stockholm 70 (Sweden)

1965–1969 Hegnauer, R., Prof.
Institut voor Chem. Plantensystematiek
University, Leiden (Netherlands)

1965–1969 Kjaer, A., Prof.
Department of Organic Chemistry
Den Kgl. Veterinaer- og Landbohojskole
Bülowsvej 13, Copenhagen (Denmark)

1965–1969 Ourisson, H., Prof.
Institut de chimie, Université de Strasbourg,
Strasbourg (France)

1965–1969 Price, J.R., Dr.
CSIRO, Division of Organic Chemistry
Chemical Research Laboratories, P.O. Box 4331
Melbourne, Victoria (Australia)

IV DIVISION OF BIOLOGICAL CHEMISTRY
DIVISION DE CHIMIE BIOLOGIQUE

Division Committee / Comité de Division

Titular Members

President

1963–1967 Sperry, W.M., Prof.
Department of Biochemistry, Columbia University
722 West 168 Street, New York 32 NY (USA)

Vice-Presidents

1963–1967 Sir Ennor, A.H., CBE
The John Curtin School of Medical Research
Australian National University
P.O. Box 275, Canberracity A.C.T. (Australia)

1963–1967 Orekhovitch, V.N., Prof.
Academy of Medical Science, Institute of Medical and Biological Chemistry
10 Pogodin Street, Moscow G-117 (USSR)

Secretary

1963–1967 Rapport, M.M., Prof.
Albert Einstein College of Medicine
1300 Morris Park Avenue, New York 61, NY (USA)

Members

1963–1967 Courtois, J.E., Prof.
Hôpital Laënnec
42, rue de Sèvres, Paris 7e (France)

1965–1969 Favarger, P., Prof.
Laboratoire de Chimie physiologique, Ecole de Médecine de l'Université de Genève
1200 Genève (Switzerland)

1965–1969 Hoffmann-Ostenhof, O., Prof.
Organisch-chemisches Institut
Währinger Strasse 38, Wien IX (Austria)

1963–1967 Klenk, E., Prof.
Physiologisch-chemisches Institut der Universität
Josef-Stelzmann-Str. 52, 5 Köln-Lindenthal (Germany)

1963–1967 Klyne, W., Prof.
Chemistry Department, Westfield College
Hampstead, London NW 3 (UK)

1963–1967 Ukita, T., Prof.
Faculty of Pharmaceutical Sciences, University of Tokyo
1, Motofuji-cho, Hongo, Bunkyo-ku, Tokyo (Japan)

IV.1 Joint Commission: Biochemical Nomenclature
Commission mixte: Nomenclature biochimique

Chairman

IUB — HOFFMANN-OSTENHOF, O., Prof.
Organisch-Chemisches Institut der Universität
Währinger Strasse 38, Wien IX (Austria)

Secretary

IUPAC 1965–1969 — COHN, W., E., Dr.
Biology Division
Oak Ridge National Laboratory, P.O. Box Y, Oak Ridge, Tenn. (USA)

Members

IUB — BRAUNSTEIN, A.E., Prof.
Institute of Molecular Biology, Academy of Sciences of the USSR
Vavilov St. 18, Mocow (USSR)

IUB — FRUTON, J.S., Prof.
Yale University, Sterling Hall of Medicine
333 Cedar St., New Haven, Conn. (USA)

IUPAC 1959–1967 — KEIL, B., Dr.
Czechoslovak Academy of Sciences, Institute of Organic Chemistry and Biochemistry
Na cvicisti 2, Prague 6, (Czechoslovakia)

IUPAC 1965–1969 — KLYNE, W., Prof.
Chemistry Department, Westfield College
Hampstead, London NW 3 (UK)

IUB — LIÉBECQ, C., Prof.
Laboratoire de Biochimie
1, rue des Bonnes-Villes, Liège (Belgium)

IUPAC 1959–1967 — MALMSTRÖM, B., Prof.
Department of Biochemistry, University of Gothenburg
Gibraltargatan 5A, Göteborg S (Sweden)

IUPAC 1959–1967 — SCHWYZER, R., Prof.
Institut für Molekularbiologie, Eidg. Techn. Hochschule
8006 Zürich (Switzerland)

IUB — SLATER, E.C., Prof.
Laboratorium voor Biochemie
Jonas Daniel Meijerplein 3, Amsterdam C (Netherlands)

Corresponding Member

TAMIYA, N., Prof.
Tokyo Medical and Dental University
3-Chome, Yushima, Bunkyo-ku, Tokyo (Japan)

IV.2 Commission: Clinical Chemistry
Commission: Chimique clinique

Titular Members

Chairman

1963–1967 Courtois, J.E., Prof.,
Hôpital Laënnec,
42, rue de Sèvres, Paris 7e (France)

Secretary

1963–1967 Sanz, M.C., Dr.
Centre de Chimie clinique
30, bd de la Cluse, 1211 Genève 4 (Switzerland)

Members

1959–1967 Jackson, S.H., Dr.
Hospital for Sick Children
555 University Avenue, Toronto 2, Ontario (Canada)

1959–1967 MacLagan, N.F., Prof.
Westminster Medical School
17 Horse Ferry Road, London SW 1 (UK)

1959–1967 Orekhovitch, V.N., Prof.
Academy of Medical Science, Institute of Medical and Biological Chemistry
Pogodin Street 10, Moscow G-117, (USSR)

1963–1967 Rubin, M., Dr.
Department of Biochemistry, Georgetown University Hospital
Washington, DC 20037 (USA)

1963–1967 Ruyssen, R., Prof.
St. Jansvest 12, Ghent (Belgium)

1963–1967 de Wael, J., Dr.
Ingenhouzstraat 43, Utrecht (Netherlands)

National Representatives

Australia Curnow, D.H., Dr.
Royal Perth Hospital, Perth

Czechoslovakia Horejsi, J., Prof.
Czechoslovak Biochemical Society, U Nemocnice 5, Prague 11

Denmark Lous, P., Dr.
Department of Clinical Chemistry
Bispebjergs Hospital, Copenhagen N.V.

Finland Saris, N.E., Dr.
Central Laboratory, Aurora Hospital, Helsinki

Germany Werle, E., Prof., Dr.
Klinisch-Chemisches Institut an der Chirurgischen Universitätsklinik
Nussbaumstrasse 20, 8 München

Iran	GAGUIK, H., Dr. Prof. of Biochemistry University of Teheran Fleming Laboratory, Aziz Khan Square, Teheran
Japan	YAMAMURA, Y., Prof. 3rd Dept. of Internal Medicine Osaka University Hospital, Fukushima-ku, Osaka
Norway	SKAUG, O.E., Prof. Sentrallaboratoriet, Lier Sykehus, Lier
Sweden	AGNER, K., Dr. Department of Clinical Chemistry, St. Görans Sjukhus Stockholm
United Kingdom	LATNER, A.L., Prof. Department of Clinical Biochemistry Royal Victoria Infirmary, Newcastle-upon-Tyne 1

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DIVISION DE CHIMIE ANALYTIQUE

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1965–1969 West, P.W., Prof.
Chemistry Department, Louisiana State University
Bâton Rouge 3, La (USA)

Vice-President (Past-President)

1965–1967 Malissa, H., Prof.
Technische Hochschule
Getreidemarkt 9, Vienna VI (Austria)

Secretary

1961–1967 Degens, P.N., Jr., Dr.
Badhuisweg 3, Amsterdam-N (Netherlands)

Members

1963–1967 Babko, A.K., Prof.
Institute of Inorganic Chemistry, Academy of Sciences of Ukrain
Leontovichstreet 9-a, Kiev (USSR)

1965–1969 Fujinaga, T., Prof.
Department of Chemistry, Faculty of Science
Kyoto University, Kyoto (Japan)

1963–1967 Gautier, J.A., Prof.
1, rue Cabanis, Paris 14e (France)

1965–1969 Hume, D.N., Prof.
Department of Chemistry, Massachusetts Institute of Technology
Cambridge 39, Mass. (USA)

1965–1969 Kaiser, H., Prof.
Institut für Spektrochemie und angewandte Spektroskopie
Bunsen-Kirchhoff-Strasse, 46 Dortmund (Germany)

1965–1969 Kemula, W., Prof.
Warsaw University, Department of Chemistry, ul. Pasteura 1
Warsaw 22 (Poland)

1963–1967 Smales, A.A., Dr.
Atomic Energy Research Establishment
Harwell, Didcot, Birkshire (UK)

V.I Commission: Analytical Reactions and Reagents
Commission: Réactions et Réactifs analytiques

Titular Members

Chairman

1961–1967 Veibel, S., Prof.
Department of Organic Chemistry, Technical University
Sølvgade 83, Copenhagen K (Denmark)

Secretary

1959–1967 Johnson, W.C.,
Hopkin & Williams Ltd.,
Freshwater Road, Chadwell Heath, Essex (UK)

Members

1961–1967 Jureček, M., Prof.
School of Chemical Engineering
Pardubice (Czechoslovakia)

1965–1969 Ma, T.S., Prof.
City University of New York, Brooklyn College
Brooklyn 10, New York (USA)

1961–1967 Mukherji, A.K., Dr.
Chemistry Department Drexel Institute of Technology,
Philadelphia, Pennsylvania 19104 (USA)

1961–1967 Pesez, M., Dr.
Directeur de la Division analytique, Roussel-Uclaf
102, route de Noisy, Romainville (Seine) (France)

1962–1967 Sawicki, E., Dr.
Division of Air Pollution, Taft Sanitary Engineering Center
4676 Columbia Parkway, Cincinnati 26, Ohio (USA)

1963–1967 Stephen, W.I., Dr.
Chemistry Department, University of Birmingham
Edgbaston, Birmingham 15 (UK)

Associate Members

Bartos, J., Dr.
Chef du Service de Recherches analytiques, Roussel-Uclaf
102, route de Noisy, Romainville (Seine) (France)

Goldstein, D., Dr.
Laboratorio da Produçao mineral, Ministerio da Agricultura
Avenida Pasteur 404, Rio de Janeiro (Brazil)

Jart, A., Dr.
Den Polytekniske Laereanstalts, Organisk-Kemiske Lab.
Sølvgade 83, Copenhagen K (Denmark)

Pellerin, F., Prof.
Chaire de Chimie organique, Faculté de Pharmacie
Université de Paris
4, avenue de l'Observatoire, Paris 6e (France)

Welcher, F.J., Prof.
Department of University Extension, Indiana University
518 North Delaware Street, Indianapolis 4, Ind. (USA)

V.2 Commission: Microchemical Techniques
Commission: Techniques microchimiques

Titular Members

Chairman

1965–1969 SCHÖNIGER, W., Dr.
Microanalyt. Dept., Sandoz Ltd.
4002 Basel 13 (Switzerland)

Secretary

1965–1969 LÉVY, R., Dr.
Dir. Service central de Microanalyse du CNRS
39bis, rue de Dantzig, Paris 15e (France)

Members

1965–1969 FLASCHKA, D.H., Prof.
Georgia Institute of Technology, Department of Chemistry
Atlanta, Ga. (USA)

1965–1969 GEL'MAN, N.E., Dr.
Institute of Elemental Organic Compounds, Academy of Science
Vorobievskoye chaussée, Moscow (USSR)

1965–1969 KOCH, W., Prof.
Chemische Laboratorien August-Thyssen-Hütte AG,
41 Duisburg-Hamborn (Germany)

1965–1969 STEYERMARK, A., Dr.
Microchemical Department, Hoffmann-La Roche Inc.
Roche Park, Nutley 10, N.J. (USA)

1965–1969 VEČEŘA, M., Dr., VÚOS, Pardubice-Rybitví (Czechoslovakia)

Associate Members

CHENG, K.C., Dr.
RCA Laboratories, Princeton, N.J. (USA)

KÖRBL, J., Ing.
Research Institute of Pharmacy and Biochemistry
Kouřimská 17, Prague 12 (Czechoslovakia)

MACDONALD, A.M.G., Dr.
Chemistry Department, University of Birmingham, Edgbaston,
Birmingham 15 (UK)

MALISSA, H., Prof.
Technische Hochschule
Getreidemarkt 9, Vienna VI (Austria)

V.3 Commission: Analytical Nomenclature
Commission: Nomenclature analytique

Titular Members

Chairman

1963–1967 Belcher, R., Prof.
Chemistry, Department University of Birmingham, Edgbaston, Birmingham 15 (UK)

Secretary

1965–1969 West, T.S., Prof.
Chemistry Department, Imperial College, South Kensington London SW 7 (UK)

Members

1959–1967 Ambrose, D., Dr.
National Physical Laboratory
Teddington, Middlesex (UK)

1961–1967 Bayer, E., Prof.
Chemisches Institut der Universität
Wilhelmstrasse 33, Tübingen (Germany)

1963–1967 Fennell, R.W.,
Ministry of Aviation, Chemistry Department
Royal Aircraft Establishment, Farnborough, Hants (UK)

1965–1969 Fischer, W., Prof.
Anorganisch-chemisches Institut
Callinstrasse 46, Hannover (Germany)

1965–1969 Irving, H.M.N.H., Prof.
Chemistry Department, The University of Leeds
Leeds 2, Yorks (UK)

1961–1967 Sandell, E.B., Prof.
School of Chemistry, University of Minnesota
Minneapolis 14, Minn. (USA)

Associate Members

Alimarin, I.P., Prof.
V.I. Vernadsky Institute of Geochemistry and Analytical Chemistry
Vorobievskoye chaussće 47a, Moscow V-334 (USSR)

Samuelson, O., Prof.
Chalmers Institute of Technology,
Gibraltargatan 5 A, Gothenburg (Sweden)

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Spectrochemical and other Optical Procedures for Analyses

Commission:
Spectroanalyse et autres méthodes optiques d'analyse

Titular Members

Chairman

1965–1969 KAISER, H., Prof.
Institut für Spektrochemie und angewandte Spektroskopie
Bunsen-Kirchhoffstrasse, 46 Dortmund (Germany)

Secretary

1965–1969 FASSEL, V., Prof.
Chemistry Department, Iowa State University
Ames, Iowa (USA)

Members

1965–1969 GUYER, H., Dr.
Dätwyler A.G.,
6460 Altdorf/Uri (Switzerland)

1959–1967 MANDELSTAM, S., Prof.
Lebedev Physical Institute, Moscow University
K-12 pr. Sapunova, Moscow 127 (USSR)

1961–1967 SALPETER, E.W., Dr.
Laboratorio astrofisico, Specola Vaticana
Castel Gandolfo, Città del Vaticano (Italy)

1961–1969 SCRIBNER, B.F., Dr.
Chief, Spectrochemistry Section, National Bureau of Standards
Washington 25, DC 20234 (USA)

Associate Members

BILLS, K.M., Dr.
International Nickel Limited
Wiggin Street, Birmingham 16 (UK)

BIRKS, L.S.,
U.S. Naval Research Laboratory
Washington 25, DC (USA)

KVALHEIM, A., Dr.
Norges Geologiske Undersøkelse
Leiv Eirikssons Vei 39, Trondheim (Norway)

LOEUILLE, E.
13, rue Racine, Viroflay (S.-et-O.) (France)

MENZIES, A.C., Dr.
Hilger and Watts Ltd.
98 St. Pancras Way, Camden Road, London NW 1 (UK)

PLSKO, E.
Hanacka ul. 4, Bratislava (Czechoslovakia)

STRASHEIM, A., Dr.
National Physical Laboratory, P.O. Box 395
Pretoria (South Africa)

V.5 Commission: Electroanalytical Chemistry
Commission: Chimie électro-analytique

Titular Members

Chairman

1965–1969 KEMULA, W., Prof.
Chemistry Department, Warsaw University
ul. Pasteura 1, Warsaw 22 (Poland)

Secretary

1963–1967 ROBINSON, R. A., Prof.,
National Bureau of Standards
Washington, DC, 20234 (USA)

Members

1965–1969 CHARLOT, G., Prof.
18, rue Berthollet, Paris 5e (France)

1965–1969 KOLTHOFF, I.M., Prof.
School of Chemistry, University of Minnesota
Minneapolis, Minn. 55455 (USA)

1965–1969 TANAKA, N., Prof.
Department of Chemistry, Tohoku University
Sendai (Japan)

1963–1967 VIANELLO, E., Dr.
Centro di Polarografia, Università di Padova
Via Leonardo Loredan 4, Padova (Italy)

1963–1967 ZUMAN, P., Dr.
Polarographic Institute, Czechoslovak Academy of Science
Opletalova 25, Prague 1 (Czechoslovakia)

Associate Members

BATES, R.G., Dr.
National Bureau of Standards
Washington, DC, 20234 (USA)

BRUCKENSTEIN, S., Prof.
School of Chemistry, University of Minnesota
Minneapolis, Minn., 55455 (USA)

COETZEE. J.F., Dr.
Department of Chemistry, University of Pittsburgh
Pittsburgh 13, Penn. (USA)

DELAHAY, P., Prof.
Department of Chemistry, New York University
Washington Square, New York, NY 10003 (USA)

GALUS, Z., Dr.
Department of Inorganic Chemistry, Warsaw University
ul. Pasteura 1, Warsaw 22 (Poland)

Gierst, L., Prof.
Université libre
Ave F.-D. Roosevelt, Brussels (Belgium)

Meites, L., Prof.
Department of Chemistry, Brooklyn Polytechnic Institute
Brooklyn 1, New York 11201 (USA)

Perrin, D. D., Dr.
Department of Medical Chemistry, The John Curtin School of Medical Research, The Australian National University
Canberra, A.C.T. (Australia)

National Representatives

Fujinaga, T., Prof.
Faculty of Sciences, Kyoto University
Kyoto (Japan)

Stradinš, J., Dr.
Institute of Organic Chemistry, Academy of Science
Riga, Latvijas SSR (USSR)

Observers

Badoz-Lambling, Mrs. J., Dr.
Faculté des Sciences de Paris, Laboratoire de Chimie analytique, EPCI
10, rue Vauquelin, Paris 5e (France)

Bishop, E.
University of Exeter, Department of Chemistry
Stocker Road, Exeter (UK)

V.6 Commission: Equilibrium Data
Commission: Données d'Equilibre

Titular Members

Chairman

1965–1967 Marcus, Y., Dr.
Nuclear Chemistry Department,
Lawrence Radiation Laboratory
Berkeley 4, Cal. (USA)

Secretary

1965–1969 Rossotti, F.J.C., Dr.
Inorganic Chemical Laboratory
South Parks Road, Oxford (UK)

Members

1965–1969 Beck, M., Dr.
Institute of Inorganic and Analytical Chemistry,
University of Szeged
P.O. Box 440, Szeged (Hungary)

1965–1969 Biedermann, G., Prof.
Department of Inorganic Chemistry, KTH
Stockholm 70 (Sweden)

1965–1969 Leussing, D.L., Prof.
Department of Chemistry, Ohio State University
Columbus, Ohio (USA)

1965–1967 Rogers, L.B., Prof.
Purdue University
Lafayette, Ind. (USA)

1963–1967 Schwarzenbach, G., Prof.
Institut für Anorganische Chemie, ETH
Universitätsstrasse 6, 8006 Zürich (Switzerland)

1965–1969 Yamasaki, K., Prof.
Department of Chemistry, Nagoya University
Chikusa, Nagoya (Japan)

Associate Members

Anderegg, G., Dr.
Institut für Anorganische Chemie, ETH
Universitätsstrasse 6, 8006 Zurich (Switzerland)

Dyrssen, D., Prof.
Department of Analytical Chemistry, University of Gothenburg
Gibraltargatan 5a, Gothenburg S (Sweden)

Freiser, H., Prof.
Department of Chemistry, University of Arizona
Tuscon, Ariz. 85721 (USA)

Hindman, J.C., Dr.
Chemistry Division, Argonne National Laboratory
P.O. Box 299, Lemont, Ill. (USA)

Hume, D.N., Prof.,
Department of Chemistry Massachusetts Institute of Technology
Cambridge 39, Mass. (USA)

Martell, A.E., Prof.
Department of Chemistry, Illinois Institute of Technology
Chicago H 60616, Ill. (USA)

Sillen, L.G., Prof.
Department of Inorganic Chemistry, Royal Institute of Technology (KTH)
Stockholm 70 (Sweden)

Yatzimirskii, K.B., Prof.
Institute of General and Inorganic Chemistry of the
Ukrainian Academy of Sciences
Ul. Leontovicha 9-a, Kiev (USSR)

Observer

Helfferich, F.G., Dr.
Shell Development Comp.
Emeryville 8, Cal. (USA)

V.7 Commission: Analytical Radiochemistry and Nuclear Materials

Commission: Radiochimie et Matériaux nucléaires

Titular Members

Chairman

1965–1969 Cook, G.B., Mr.
International Atomic Energy Agency
Kärtnerring 11, Vienna I (Austria)

Secretary

1965–1969 Meinke, W.W., Dr.
Head, Division of Analytical Chemistry, National Bureau of Standards
Washington, DC 20234 (USA)

Members

1965–1969 Crespi, M.B.A., Dr.
Director of Research, Argentine Atomic Energy Commission
Avenida del Libertador 8250, Buenos Aires (Argentina)

1965–1969 Minczewski, J., Prof.
Chemistry Department, Technical University of Warsaw
Dorodna 16, Warsaw (Poland)

1965–1969 Smales, A.A., Dr.
Head, Analytical Chemistry Branch, Atomic Energy Research Establishment
Harwell, Didcot, Berks. (UK)

Associate Members

Hecht, F., Prof.
Analytical Chemistry Division, University of Vienna
Währinger Strasse 38, Vienna 9 (Austria)

Kosta, L., Prof.
Chemistry Division, J. Stefan Institute of Nuclear Sciences
Ljubljana, Yugoslavia, presently at IAEA,
Vienna (Austria)

VI. APPLIED CHEMISTRY DIVISION
DIVISION DE CHIMIE APPLIQUÉE

Division Committee / Comité de Division

Titular Members

President

1963–1967 Truhaut, R., Prof.
Faculté de Pharmacie, Chaire de Toxicologie, Université de Paris
4, avenue de l'Observatoire, Paris 6e (France)

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1963–1967 Gallay, W., Dr.
The E.B. Eddy Co.
Hull, P.Q. (Canada)

Past-President

1963–1967 Bushill, J.H., Dr.
149 Hammersmith Road, London W14 (UK)

Secretaries
for VI.1, VI.2, VI.3, VI.5, VI.6

1963–1967 Bourbon, P., Prof.
Faculté de Médecine et de Pharmacie
37, allée Jules-Guesde, Toulouse (Hte-Gar.) (France)

for VI.4, VI.7, VI.8, VI.9

1963–1967 Gardy, H., Prof.
Faculté des Sciences de Toulouse, Institut du Génie chimique
Chemin de la Loge (Empalot), Toulouse (Hte-Gar.) (France)

Members

1965–1969 Boekenoogen, H.A., Prof.
«Het Boekelaer», Overasebaans, Rijsbergen, N.Br. (Netherlands)

1963–1967 Gabrielson, C.O., Dr.
Mo & Domsjö AB
Oernsköldsvik (Sweden)

1961–1967 Gage, J.C., Dr.
Industrial Hygiene Research Laboratories, Imperial Chemical Industries Ltd.
Alderley Park, Macclesfield, Cheshire (UK)

1965–1969 Hurtig, H., Dr.
Canada Department of Agriculture, Research Branch
Central Experimental Farm
Ottawa (Canada)

1963–1967 Jensen, W., Prof.
Finnish Pulp and Paper Research Institute
P.O. Box 136, Helsinki (Finland)

1963–1967 Kline, G.M., Prof.
331 South Palmway, Lake Worth, Florida 33460 (USA)

1961–1967 Oser, B.L., Dr.
Food and Drug Research Laboratories Inc.
Maurice Avenue at 58th Street, Maspeth 78, New York City
NY (USA)

1963–1967 PATAT, F., Prof.
Technische Hochschule, 8 München (Germany)

1963–1967 RAASCHOU-NIELSON, H.K., Dr.
Lak- og Farveindustriens, Forskningslaboratorium
Odensgade 14, Copenhagen (Denmark)

1965–1969 SUOMALAINEN, H., Dr.
State Alcohol Monopoly
Hämerenkatu 51, Helsinki (Finland)

1963–1967 WOROSCHZOW, N.N., Prof.
Institute of Organic Chemistry «Norwosibirsk»,
Academy of Sciences
Vorobjevkoje chaussée 2, Moscow (USSR)

VI.1 Section: Food

Section: Bromatologie

Titular Members

Chairman

1961–1967 OSER, B.L., Dr.
Food and Drug Research Laboratories Inc.
Maurice Avenue at 58th Street, Maspeth 78, New York, NY (USA)

Secretary

1961–1969 FRANCOIS, A., Prof.
Directeur de la Station centrale de Nutrition,
Institut national de la Recherche agronomique
Domaine de Vilvert, Jouy-en-Josas (S.-et-O.) (France)

Members

1964–1969 BIGWOOD, E.J., Prof.
Professeur émérite et Recteur honoraire de l'Université de Bruxelles
48, rue Emile-Bouilliot, Brussels (Belgium)

1964–1969 FISCHBACH, H., Dr.
Director, Division of Food, Bureau of Biological and Physical Sciences, US Food and Drug Administration
Washington 25, DC (USA)

1961–1967 FRAZER, A.C., Prof.
Department of Medical Biochemistry and Pharmacology
Medical School, University of Birmingham
Birmingham 15 (UK)

1961–1967 KENT-JONES, D.W., Dr.
The Laboratories Dudden Hill Lane
Willesden, London NW 10 (UK)

1961–1967 SOUCI, S.W., Prof.
Direktor der Deutschen Forschungsanstalt für Lebensmittelchemie
Leopoldstrasse 175, 8 München 23 (Germany)

1961–1967 Truhaut, R., Prof.
Université de Paris, Faculté de Pharmacie, Chaire de Toxicologie
4, avenue de l'Observatoire, Paris 6e (France)
(Member ex officio)

Associate Member

Högl, O., Prof.
Präsident des Europäischen Rates des Codex Alimentarius
Taubenstrasse 18, 3011 Berne (Switzerland)

VI.1.1 Commission: Trace Substances
Commission: Substances existant à l'état de trace

Titular Members

Chairman

1964–1969 Fischbach, H., Dr.
Director, Division of Food, Bureau of Biological and Physical Sciences, US Food and Drug Administration
Washington 25, DC (USA)

Members

1964–1969 Dikun, P.P., Dr.
Oncological Institute of the Academy of Medical Sciences of the USSR
Leningrad (USSR)

1964–1969 Hoff, J.E., Dr.
Department of Horticulture, Purdue University
Lafayette, Indiana (USA)

1964–1969 Raymond, W.D., Dr.
Tropical Products Institute
56–62 Gray's Inn Road, London WC 1 (UK)

1964–1969 Tilgner, D.J., Dr.
Department of Animal Products Technology
Politechnika Gdanks, Gdansk 6 (Poland)

1964–1969 Wogan G.N. Dr.
Department of Food Technology
Massachusetts Institute of Technology, Cambridge, Mass. (USA)

Associate Members

Dalgaard-Mikkelsen, S., Dr.
Royal Veterinary College
Copenhagen (Denmark)

Frayssinet, C., Dr.
Centre de Recherches sur la Cellule normale et cancéreuse
Université de Paris
16bis, avenue Vaillant-Couturier, Villejuif (Seine) (France)

de Iongh, H., Dr.
Unilever Research Laboratory
Deltaweg 160, Vlaardingen (Netherlands)

Simpson, T.H., Dr.
Torry Research Station
135 Abbey Road, Aberdeen (Scotland)

VI.1.2 Commission: Food Additives
Commission: Additifs alimentaires

Titular Members

Chairman

1961–1967 Frazer, A.C., Prof.
Department of Medical Biochemistry and Pharmacology
Medical School, University of Birmingham
Birmingham 15 (UK)

Members

1961–1967 Oser, B.L., Dr.
Food and Drug Research Laboratories Inc.
Maurice Avenue at 58th Street, Maspeth 78, New York, NY (USA)

1961–1967 Souci, S.W., Prof.
Direktor der Deutschen Forschungsanstalt für Lebensmittelchemie
Leopoldstrasse 175, 8 München 23 (Germany)

1965–1969 Souto, A.B., Dr.
Instituto Adolfo Lutz, Laboratorio de Saude publica
Avenida Dr Arnaldo 3, São Paulo (Brazil)

1961–1967 Truhaut, R., Prof.
Université de Paris, Faculté de Pharmacie, Chaire de Toxicologie
4, avenue de l'Observatoire, Paris 6e (France)
(Membre ex officio)

VI.2 Section: Fermentation industries
Section: Fermentation

Titular Members

Chairman

1965–1969 Suomalainen, H., Dr.
State Alcohol Monopoly
Itämerenkatu 51, Helsinki (Finland)

Vice-Chairman

1965–1969 Langlykke, A.F., Dr.
The Squibb Institute for Medical Research
New Brunswick, NJ. 08903 (USA)

Hon. Secretary

1965–1969 PARISI, F., Dr.
Distillerie Italiane
Via Chiaravalle 9, Milano (Italy)

Members

1965–1969 ARIMA, K., Prof.
Department of Agricultural Chemistry, The University of Tokyo
Bunkyo-ku, Tokyo (Japan)

1963–1967 BUNKER, H.J.
17 Radnor Road, Twickenham, Middlesex (UK)

1963–1967 CUTHBERTSON, W.F.J., Dr.
Glaxo Laboratories Ltd.
Greenford, Middlesex (UK)

1963–1967 LUNDIN, H., Prof.
Division of Food Chemistry, Royal Institute of Technology
Valhallavägen 79, Stockholm 70 (Sweden)

Associate Members

BIROLAUD, P.
Syndicat des Producteurs de Levure-Aliment de France
2, rue de l'Oratoire, Paris 1er (France)

DREWS, B., Prof.
Institut für Gärungsgewerbe
Seestrasse 13, 1 Berlin 65 (Germany)

GENEVOIS, L., Prof.
Université de Bordeaux
351, cours de la Libération, Talence (Gir.) (France)

GUYMON, J., Prof.
Department of Viticulture and Enology, University of California
Davis, Cal. (USA)

LIGHT, R.F.M., Standard Brands Inc.
625 Madison Avenue, New York 22, NY (USA)

MALÉK, I., Academician
Czechoslovak Academy of Sciences
KRČ, Budéjovicka 1083, Prague 4 (Czechoslovakia)

PEPPLER, H.J., Universal Foods Corporation
P.O. Box 737, Milwaukee, Wisc., 53201 (USA)

VI.3 Section: Oils and Fats
Section: Matières grasses

Titular Members

Chairman

1965–1969 Boekenoogen, H. A., Prof.
"Het Boekelaer", Overasebaan 5, Rijsbergen, (N. Br.) (Netherlands)

Vice-Chairman

1965–1969 Bertrand, J. E.
158, avenue Voltaire, Bruxelles 3 (Belgium)

Secretary

1963–1967 Vos, H. J.
Populierenlaan 1a, Bosch en Duin, Zeist (Netherlands)

Members

1965–1969 Bosshard, A., Dr.
Plüss-Stauffer AG
4665 Oftringen (Switzerland)

1965–1969 Heinz, H. J., Dr.
Henkel & Cie. GmbH,
Schliessfach 1100, Düsseldorf-Holthausen (Germany)

1965–1969 Maleničky, M., Ing.
Severoceské Tukové Závody, Karla IV 305, Usti nad Labem (Czechoslovakia)

1965–1969 Paquot, C., Prof.
Laboratoire de Lipochimie
Groupe des Laboratoires du CNRS de Vitry-Thiais
rue Henri-Dunant, 75 Thiais (S) (France)

1965–1969 Rutkowski, A., Prof.
Instytut Chemii Ogólney
ul. Rydygiera 8, Warsaw 86 Zoliborz (Poland)

Associate Members

Naudet, M., Prof.
148, rue Edmond-Rostand, Marseille 8e (France)

Raymond, W. D., Dr.
Tropical Products Institute
56/62 Gray's Inn Road, London WC 1 (UK)

National Representatives

Argentina Cattaneo, P., Prof.
Instituto Argentino de Racionalización de Materiales
Chile nº 1192, Buenos Aires

Loew, G., Dr.
Via Mascarella 77/3, Bologna (Italy)

Austria CZEDIK-EYSENBERG, P.B., Dr.
Österreichische Unilever GmbH.
Breitenfurterstrasse 239, Atzgersdorf, Wien 23

GORBACH, G., Prof.
Technische Hochschule Graz
Schlögelgasse 9, Graz

SCHMID, L., Prof.
Lehrkanzel für Lebensmittelchemie an der Universität Wien
Währingerstrasse 38, Wien IX

Belgium DELVAUX, E.L., Prof.
27, avenue Léon-Darte, Heverle-Leuven

LONCIN, M., Prof.
Centre d'Enseignements et de Recherches des Industries Alimentaires et Chimiques (CERIA)
1, avenue E.-Gryson, Bruxelles 7

Czechoslovakia POKORNY, J., Dr.
Institute of Chemical Technology
Department of Food Chemistry and Analysis
Technická ćp 1905, Prague 6 Dejvice

Denmark ERRBOE, J.
Aarhus Oliefabrik, Aarhus

LINTZ-CHRISTENSEN, S.B.
Dansk Sojakagefabrik AS
24 Islands Brygge, Copenhagen S

PETERSEN, A.
Margarine Compagnie M.C.
9 Otto Monsteds plads, Copenhagen V

France DESNUELLE, P., Prof.
Faculté des Sciences
place Victor-Hugo, Marseille

Germany WENDT, H., Dr.
Margarine-Union
Friedensallee 333, (2) Hamburg-Bahlenfeld

Ireland BREADEN, T.W.
E. McCormack & Co. Ltd, Soap and Chemical Manufacturers
West Pier, Dun Laoghaire (Co. Dublin)

DAVIDSON, V.E.
Clover Meats Ltd., Waterford

HALPIN, G.G., The Irish Oil and Cake Mills Ltd.
Marsh Road, Drogheda

Italy BALESTRINI, G., Dr.
Via Tamburini 12, Milano

JACINI, G., Prof.
Stazione sperimentale per le Industrie degli Olii e dei Grassi
Via G. Colombo 79, Milano

MONACELLI, R.
Istituto superiore di Sanità
Viale Regina Elena 299, Roma

Netherlands	HOEKE, F., Dr. Keuringsdienst van Waren Baan 74, Rotterdam 1
Poland	GRYNBERG, Mme H., Dr. Instytut Chemii Ogólnej ul. Rydygiera 8, Warsaw 86
	NIEWIADOMSKI, H., Prof. Politechnika Gdanska Gdansk-Wrzeszcs
Spain	GRACIAN-TOUS, J., Dr. Instituto de la Grasa y sus Derivados Avenida Heliopolis 4, Sevilla
	MARTINEZ-MORENO, J., Prof. Instituto de la Grasa y sus Derivados Avenida Heliopolis 4, Sevilla
	RANEDO, J. Espalter 15, Madrid
Sweden	HELLSTEN, M. c/o AB Helios Kemisktekniska Fabriker Tellusborgsvägen 100, Stockholm 32
	OLIN, E., Ing., AB Karlshamns Oljefabriker Karlshamn
	WODE, G., Dr. Margarinbolaget AB Nyängsvägen 155, Bromma
Switzerland	BRÜSCHWEILER, H., Dr. Eidgenössische Materialprüfungs-Anstalt (EMPA) Untere Strasse 11, 9000 St. Gallen
	KLEINERT, J., Dr. c/o Lindt & Sprüngli, Kilchberg-Zürich
United Kingdom	LEE, W.V., The British Oil and Cake Mills Ltd. Albion Wharf, Erith, Kent
	LEWKOWITSCH, Mrs. P.R. ELSA, Dr. 71 Priory Road, West Hampstead, London NW 6
	WILLIAMS, K.A., Dr. 161–165 Roseberry Avenue, London EC 1
USA	EMBREE, N., Dr. Vice-president, Technical Operations Distillation Products Industries Rochester 3, NY
	SALLEE, E.M., Dr. The Procter & Gamble Cy., Ivorydale Technical Center, Cincinnati 17, Ohio
	SNELL, F. D., Dr. 29 West 15th Street, New York 11, NY

VI.5 Section: Toxicology and Industrial Hygiene
Section: Toxicologie et Hygiène industrielle

Titular Members

Chairman

1961–1967 Gage, J.C., Dr.
Industrial Hygiene Research Laboratories
Imperial Chemical Industries Ltd.
Alderley Park, Macclesfield, Cheshire (UK)

Secretary

1961–1969 Boudène, C., Prof.
Faculté de Pharmacie, Université de Paris
4, avenue de l'Observatoire, Paris 6e (France)

Members

1963–1967 Gerhardsson, G.
Chemical Engineer
The Swedish Employeurs Confederation
P.O. Box 16120 Stockholm 16 (Sweden)

1963–1967 Keenan, R.G., Prof.
Public Health Service
1014 Broadway, Cincinnati 2, Ohio (USA)

1965–1969 Metrico, L., Dr.
Laboratorio Igiene industriale Montecatini
Via S. Barnaba 8, Milano (Italy)

1965–1969 Vasak, V., Dr.
Institute of Industrial Hygiene
Srobarova 48, Prague-Vinohrady (Czechoslovakia)

Associate Members

Hunold, G.A., Prof.
Bundesgesundheitsamt, Institut für Wasser-, Boden- und Lufthygiene
Correnplatz 1, Berlin-Lichterfelde (Germany)

Kitagawa, T., Prof.
Faculty of Engineering, Yokohama National University
Ohka-Machi, Minami-ku, Yokohama (Japan)

Silverman, L., Prof.
Harvard University School of Public Health
55 Shattuck Street, Boston 15, Mass. (USA)

Truhaut, R., Prof.
Faculté de Pharmacie, Université de Paris
4, avenue de l'Observatoire, Paris 6e (France)

VI.6 Section: Pesticides

Section: Pesticides

Titular Members

Chairman

1965–1969 Hurtig, H., Dr.
Canada Department of Agriculture, Research Branch
Central Experimental Farm, Ottawa (Canada)

Secretary

1965–1969 Resnick, Ch., Dr.
Plant Protection Department
Ministry of Agriculture
P.O.B. 15030, Jaffa (Israel)

Members

1965–1969 Alessandrini, M.E., Miss, Prof.
Via di Villa Sacchetti 13, Roma (Italy)

1963–1967 Chabrolin, M.C., Dr.
c/o Péchiney-Progil
7, rue Lamennais, Paris 8e (France)

1965–1969 Cook, J.W., Dr.
Division of Foood Chemistry Food and Drug Administration
Washington, DC (USA)

1963–1967 Galley, R., Dr.
c/o Shell Research Ltd., Woodstock Agricultural Research Center
Sittingbourne, Kent (UK)

1965–1969 Treboux, J., Dr.
c/o J.R. Geigy AG
4000 Basle 16 (Switzerland)

VI.7 Section: Plastics and high polymers

Section: Plastiques et Produits de haute Polymérisation

Titular Members

Chairman

1963–1967 Kline, G.M., Dr.
331 South Palmway, Lake Worth, Florida 33460 (USA)

Secretary

1965–1969 McKay, A.F., Dr.
Vice-President, Monsanto Canada Limited
P.O. Box 900 Montreal 3, Quebec (Canada)

Members

1963–1967 Dring, G.,
636 Streetsbrook Road, Solihull Warwickshire (UK)

1963–1967 Dubois, P., Dr.
Director, Centre d'Etudes des Matières plastiques
21, rue Pinel, Paris 13e (France)

1963–1967 Natta, G., Dr.
Istituto di Chimica industriale del Politechnico
Via Mario Pagano 54, Milano (Italy)

1965–1969 Rodeyns, M.
Ingénieur principal à la Direction des Matières plastiques de la Société Solvay & Cie
33, rue Prince-Albert, Bruxelles (Belgium)

1965–1969 Wintergerst, S., Prof., Ing.
Lehrstuhl für Werkstoffkunde, Technische Hochschule Stuttgart
Cannstatter Str. 212, 7 Stuttgart O (Germany)

1963–1967 Wisniewski, T., Dr.
Institute of Plastics
ul. Rydygiera 8, Warszawa 86 (Poland)

National Representatives

Australia Gruen, L., Dr.
Technical Director, Monsanto Chemicals (Aust.) Ltd.
Somerville Road, West Footscray, Victoria

Austria Reichherzer, R., Prof.
Leiter des Kunststoffinstitutes im Chemischen Forschungsinstitut der Wirtschaft Österreichs
Arsenal, Objekt 212, Wien III

Schurz, J., Prof.
Institut für Physikalische Chemie der Universität Graz
Halbärthgasse 5, Graz

Belgium Ghosez, M., Directeur des Recherches de Fabelta SA
18, chaussée de Charleroi, Bruxelles

Brazil Nabuco de Araujo Neto, C.E., Dr.
Union Carbide de Brazil SA
Avenida Paulista 2073 – 23 Andar, Caixa Postal 6482, São Paulo

Zattar, W., Dr.
Esso Brasileira de Petroleo SA
Caixa Postal 970, Rio de Janeiro

Canada Hillary, B.B., Dr.
Dow Chemical of Canada Limited
Sarina, Ontario

Czechoslovakia Doležel, B., Dr.
Research Institute for Protection of Materials
u. Meštanského pivovaru 4, Prague 7

Franta, I., Prof.
Technical University of Prague,
Technicka 1905, Prague 6

France GROSS, A.
Assistant Director of Pechiney-Saint-Gobain
63, rue de Villiers, Neuilly-sur-Seine (Seine)

VESSEREAU, J., Dr.
Chef du Service, Division de la Plastique, Rhodiaceta
rue du Tunnel, Lyon (Rhône)

Germany HELLWEGE, K.H., Prof.
Director, Deutsches Kunststoffinstitut
Schlossgartenstr. 6R, 6100 Darmstadt

LEUCHS, O., Dr.
Hacketahl Draht- und Kabelwerke AG
Postfach 260, 3000 Hannover

Great Britain BARRETT J.W., Dr.
Monsanto Chemicals Ltd., Monsanto House
10–18 Victoria Street, London SW 1

STAUDINGER, J.J.P., Dr.
Technical Director, Distillers Plastics Group
Devonshire House, Picadilly, London W 1

Hungary CSŰRŐS, Z., Prof.
Head of the Dept. for Organic Technology, Technical University
Gellért rakpart 3, Budapest XI

HARDY, G., Prof.
Director of the Research Institute of the Plastics Industries
Hungaria Körut 114, Budapest XIV

Israel FEILCHENFELD, H., Dr.
Petrochemical Research Laboratory
Hebrew University, Jerusalem

VOFSI, D., Dr.
Plastics and High Polymers Laboratories
Weizmann Institute of Science, Rehovoth

Italy CRESPI, G., Prof.
Vice-Director, The Institute for Basic Research
"G. Donegani" of Montecatini SpA
Largo Donegani 1–2, Milano

Japan SOBUE H., Prof.
Faculty of Engineering, Seikei University
Kichijoji, Musashino-shi, Tokyo

Netherlands BREDT, J.W., Dr.
Rubber Research Institute TNO
Ulvenhoutschelaan 15, Breda (Gimeken)

HEIJBOER, J.
Central Laboratory, TNO
Julianalaan 132, Delft

Spain MOLERO, J.Y., Dr.
Director of the Plastic Department
Patronato "Juan de la Cierva" de Investigación Técnica
Madrid 6

VICENTE, L.M., Dr.
Director of the Division of Standardization
Patronato "Juan de la Cierva" de Investigación Técnica
Madrid 6

Sweden BERNDTSSON, B.
Director of Research, Svenska Oljeslageri AB
Gothenburg

HÖGBERG, H., Dr., Research Laboratory, Telefon AB
L. M. Ericsson
Stockholm

Switzerland DE SENARCLENS, G., Dr., Direktor, Schweiz. Isola-Werke
4226 Breitenbach

STIRNEMANN, E., Dr.
Lonza-Elektrizitätswerke und Chemische Fabriken AG
4000 Basel

United States BOYER, R.F., Dr.
Director of Plastics Research, The Dow Chemical Co.
Midland, Mich.

WEISS, P., Dr.
Head, Polymers Department, General Motors Technical Center
12 Mile and Mound Roads, Warren, Mich.

USSR AKUTIN, M.S., Dr.
Plastics Institute, State Chemistry Committee
Moscow

NAMETKIN, S.N., Dr.
Institute for Petrochemical Syntheses
Moscow

VI.8 Section: Organic Coatings
Section: Revêtements de Surface

Titular Members

Chairman

1963–1967 RAASCHOU-NIELSEN, H.K.
Lak- og Farveindustriens Forskningslaboratorium
Odensgade 14, Copenhagen (Denmark)

Secretary

1963–1967 BULT, R., Dr.
Institut für Lack- und Anstrichforschung TNO
Schoemakerstraat 97, Postfach 203, Delft (Netherlands)

Members

1965–1969 FINK-JENSEN, P.H.
Sadolin & Holmblad, Physical Laboratories
Copenhagen (Denmark)

1963–1967 HICKSON, L.R.
c/o Messrs. Hadfields (Merton) Ltd.
Mitcham (UK)

1963–1967 HUSS, M., Dr.
ER-nämnden
Sveavägen 13–15, Stockholm C (Sweden)

1963–1967 Oesterle, K.M., Dr.,
Goldbacherstrasse 88, 8700 Küsnacht-Zürich (Switzerland)

1965–1969 O'Neill L.A., Dr.
Paint Research Station
Waldegrave Road, Teddington, Middlesex (UK)

1963–1967 Wapler, D., Dr.
Bundesanstalt für Materialprüfung
Unter den Eichen 87, Berlin-Dahlem (Germany)

Associate Members

April, A.
Laboratoire de la Profession IPV,
14a, rue Simonis, Brussels (Belgium)

Cailliez, A.
Laboratoire de la Profession IPV,
14a, rue Simonis Brussels (Belgium)

Glaser, U., Dr.
Midland Industrial Finishes Co.,
East Water Street at Lake Michigan, Waukegan, Ill. (USA)

Hamann, K., Prof., Dr.
Forschungsinstitut für Pigmente und Lacke,
Wiederholdstrasse 10, 7 Stuttgart N (Germany)

Hochweber, M., Dr.
Eidg. Materialprüfungs- und Versuchsanstalt,
Überlandstrasse 129, Dübendorf ZH (Switzerland)

Laar, J.A.W., Dr. van
Philips' Gloeilampenfabrieken NV
Chem. Lab. App. SL4,
Eindhoven (Netherlands)

Talen, H.W., Dr.
Verfinstituut TNO,
Postbus 203, Delft (Netherlands)

National Representatives

Belgium — OOSTENS, E.
48, avenue Jean-de-Bologne, Brussels 2

France — PETIT, J., Dr.
Centre national de la Recherche scientifique
rue H.-Dunant, Thiais (Seine)

Germany — MIKUSCH, J.D., Dr. von
Hauptlaboratorium Margarine Union AG
Harburger Schlossstrasse 20, Hamburg- Harburg

Italy — PAGANI, D., Prof.
Istituto di Chimica industriale del Politecnico
Piazza Leonardo da Vinci 32, Milano

Sweden — ANDERSSON, B., Dr.
A.B. Wilh. Becker
Stockholm 9

Switzerland — BLOM, A.V., Dr.
Vigneto Roncaccio
Monti della Trinità
Locarno

United Kingdom — SOAR, D.G.
c/o F.W. Berk & Co., Ltd.
Berk House, 8, Baker Street, London W1

United States — LONG, J.S., Dr.
University of Southern Mississippi
Southern Station, Box 154, Hattiesburg, Miss. 39401

VI.9 **Section: Pulp, Paper and Board**

Section: Pâte, Papier et Carton

Titular Members

Chairman

1963–1967 JENSEN, W., Prof.
Finnish Pulp and Paper Research Institute
P.O. Box 136, Helsinki (Finland)

Vice-Chairman

1963–1967 STOCKMANN, L.G., Prof.
Director, Central Laboratory Swedish Cellulose Industry
Drottning Kristinas Väg 61, Stockholm (Sweden)

Secretary

1963–1967 WARD, K., Jr., Dr.
The Institute of Paper Chemistry
P.O. Box 498, Appleton, Wisc. (USA)

Members

1963–1967 GRANDIS, E., Dr., c/o Cartiere Burgo
Corso Matteotti 8, Torino (Italy)

1963–1967 GRANT, J., Dr., Hehner & Cox, Ltd.
107 Fenchurch Street, London EC 3 (UK)

1965–1969 ROGOVIN, Z.A., Prof.
Textile Research Institute of Moscow
Moscow (USSR)

1963–1967 SANKEY, C.A., Dr.
Research Director, The Ontario Paper Company Ltd.
Thorold, Ontario (Canada)

1963–1967 SCHEPP, R., Dr.
Aschaffenburger Zellstoffwerke AG,
Chemische Abteilung 8201,
Redenfelden/Obb. (Germany)

Associate Members

ANKER-RASCH, O., Director
Papirindustriens Forskningsinstitutt
P.O. Box 250, Vinderen, Oslo 3 (Norway)

COHEN, W.E., Dr.
CSIRA, Division of Forest Products
P.O. Box 18, South Melbourne, SCS, Victoria (Australia)

HAVRANEK, J., Dr.
Director of Research, Paper and Pulp Research Institute
Lamacska 5, Bratislava IX (Czechoslovakia)

MONZIE, P., Chief
Department of Cellulose, Faculté des Sciences
Université de Bordeaux
Bordeaux (France)

VI.9.1 Commission: Chemical Analysis of Paper
Commission: Analyse chimique des Papiers

Chairman

LEOPOLD, B., Dr.
Director of the Empire State Paper Research Institute
Syracuse, New York (USA)

PRESIDENT'S REPORT ON THE STATE OF THE UNION

IUPAC Conference 1965

Two years ago in London the retiring President Prof. NOYES delivered, on a similar occasion to this, an outstanding report in which, among other things, he gave us a most informative review of the development of the International Union of Pure and Applied Chemistry and of the International Council of Scientific Unions of which it is an adherent. On the subject of ICSU he made out a powerful case for our view that it should be a strong organization to represent the views of science as a whole and to promote the increasing number of international inter-disciplinary projects which are now becoming a prominent feature of the world scene. Science has suffered much from the past weakness of ICSU and it is a great pleasure to see it now developing along the right lines under the vigorous leadership of Prof. THOMPSON its new President and one of our own number. He has our full support in his endeavours, and, remembering as I do with gratitude his many services to IUPAC, I am confident that ICSU could not be in better hands.

But I would like if I may to underline and perhaps to amplify and extend some of the things to which Prof. NOYES referred in his discussion of the position of IUPAC. As your President during the past two years my experience has caused me to feel that these matters warrant our most serious and, indeed, urgent attention. For it seems to me that in many ways we are at a crossroads in our affairs. IUPAC until 1947 did not really loom very large on the chemical scene; it was a small organization which, if we are honest with ourselves, we must admit was a rather select travelling club rather than an effective scientific organization. Since then much has changed, possibly under the spur of increasing scientific activity and the increasingly technological character of our civilization. Whatever the reason IUPAC has now changed out of all recognition and is now occupying an increasingly important place in international chemical activity. And it is proper that it should because, in a world so dominated by science and technology, Unions such as ours which are non-political and non-governmental have a vital role to play. As our activities and our importance have grown so also have we grown in size—not merely in the number of adhering countries but also in the number of our Divisions, Sections and Commissions. Our budget apart from UNESCO subventions has grown substantially (from $ 5000 in 1947 to $ 100000 in 1965) through the generous help received through increased subscriptions and voluntary donations from member countries and through the generosity of our friends in the chemical industry; for all this we are immensely grateful, but even now we live precariously and can hardly regard our future as assured. The financial support we need will only be forthcoming if we demonstrate that we can perform efficiently our function as a Union. We are today in a situation not unfamiliar in growing organizations in that we have reached a stage at which our traditional ways are not, in all cases, suitable for a really large organization and we must be prepared to make some alterations. We are now in the process of taking the first step. At our last Conference new draft Statutes were presented aimed to give us the structural flexibility necessary in the period of rapid change in which we now live. These Statutes which were provisionally adopted have been thoroughly reconsidered since then by a special committee and modifications which I hope will render them finally ready for ratification are before us at this Conference; we are deeply indebted to Dr. D. C. MARTIN (UK) and his Committee for the valuable service they have rendered to the Union

by this revision of the draft Statutes. But just to have flexible statutes is not enough. We must ask ourselves what the proper functions of the Union are and how it can discharge them most effectively. Some years ago our former President Prof. TISELIUS rather gloomily concluded that it could hardly be expected that the Union would be able to do more than play a relatively minor role since most important matters would be dealt with either by national or intergovernmental bodies. He was undoubtedly justified in his view considering the general state of the Union at that time. But I believe that this view is wrong provided the Union really sets out to do properly those things which it can and ought to do, and that it has very important functions to perform. Indeed, I think, that the astonishing increase in the influence of the Union during the past ten years is witness to my belief that the future of the Union is in our own hands. As I see it the functions of the Union today can be expressed in very general terms as follows:

(1) To promote the study and application of chemistry internationally by bringing together chemists of all types from different countries, to facilitate exchange of information and to promote meetings, symposia and conferences where chemical topics can be discussed.
(2) To seek international agreement on issues of importance to chemistry, e.g. nomenclature, constants, analytical methods, etc., and to provide a source of authoritative advice to other international organizations concerned with standards.
(3) To provide advice and assistance to developing countries in matters relating to the training of chemists.

These functions have been listed as they come to mind and are not put in order of importance. An effective publication service is, of course, a necessary adjunct to all three.

The first of these functions which I have mentioned is one to which increasing attention has been paid in recent years and the success which has been achieved through sponsored symposia and the growing importance of our publications is most gratifying. For the excellence of our journal "Pure and Applied Chemistry" we owe a great deal to Prof. THOMPSON, Chairman of the Editorial Board and especially to our editor Prof. WEEDON. I should like to take this opportunity of thanking them and our publishers Butterworth & Co. Ltd. for all their efforts on our behalf. Members of the Bureau and the Executive Committee have for some time felt, however, that despite our very active Division of Applied Chemistry there was need for a greater contact between the Union and chemical industry, and also for a wider range of contacts between chemists themselves in different industries. Accordingly during my term of office I invited Dr. CONNOR of Rohm & Haas Inc., USA, to form an *ad hoc* Committee of leading chemical industrialists and with it to consider in general terms how the Union might be of more help to industry. Dr. CONNOR gladly accepted and we are most grateful to him and to his colleagues for the trouble they have taken to meet, not once, but several times at considerable inconvenience to themselves, and to provide us with a report which makes a number of valuable suggestions which we are now following up. One specific proposal is that the Union should endeavour to bring together industrial chemists by organizing a special symposium on an industrial topic or topics. Clearly time did not permit of one being organized in 1965 but I am hopeful that we may be able to do so somewhere in Western Europe in 1966.

During recent years we have seen a steady growth in the number of international symposia held on chemical topics and the question of Union sponsorship has been a constant source of problems for the Executive Committee and the Bureau; I believe it is time that we faced these problems squarely, for unless we arrive at some clearly recognized rules and hold to them the

Union will either bankrupt itself or see its influence destroyed by the development of independent splinter groups. It is necessary that the Union should seek to sponsor only those symposia which are of high quality and which deal with growing points in chemistry; it should not, in my opinion, accept responsibility for providing financial support for established and continuing symposia—indeed it cannot do so for long. This is something which the Bureau must consider as a matter of urgency but I am sure that the key to the problem lies in the Divisional Committees, which ought to be active and alert in identifying growing points and in encouraging or initiating an orderly development of symposia under Union sponsorship. If they fail in this responsibility the consequences for the Union could be very serious indeed.

The second function of the Union which I outlined, i.e. that concerning international agreements and standards has two aspects. The first concerns, in the main, matters with which we have long been concerned and with which we alone can deal. I refer, of course, to matters like nomenclature, atomic weights, values of constants, etc. These I believe we do well thanks to the unremitting and immensely important, although unadvertised, work of our Commissions. The second is, however, one in which we have been a good deal less effective than we ought to be. For many years the International Standards Organization has had to deal with the setting up of international standards affecting chemistry, especially in connexion with commerce and industry, and, especially since the last war, there has been a marked increase in the number of international governmentally supported bodies in the course of whose work many chemical problems arise (e.g., the United Nations Special Agencies such as the Food and Agricultural Organization, World Health Organization etc.). All these bodies need the best chemical advice and help and it is surely the function of IUPAC to give it. Now, of course, we cannot do the work of these bodies. To carry out the investigational work required for any one of these organizations would be enormously costly and clearly this must be done on a governmental basis. We are, in any case, essentially an amateur organization depending almost wholly on the voluntary services of our Division, Section and Commission members. But for this very reason we are also a disinterested organization, and our advice is therefore eagerly sought and should be available. Surely with our Divisions we ought to be in the position of being able to give advice when required, or to indicate where such advice can be reliably obtained. I believe we must do this although again it imposes a further load on the Divisions and especially on their Presidents and Secretaries, and it will also involve an expansion and strengthening of our central Secretariat. This will cost money but I believe it will be forthcoming if we undertake this task seriously and it would be money well spent. Action on these lines will in any case be necessary if we are to fulfil our obligations as members of ICSU since that body has agreed to provide, on request, advice on scientific matters to UNESCO and will inevitably expect IUPAC to act as regards chemistry.

Our third function—that of providing assistance to developing countries—is one of increasing importance at the present time. To help discharge it we have set up under the Chairmanship of Prof. Nyholm (UK) a strong Committee on the Teaching of Chemistry; this Committee is now vigorously at work and we expect much of it. It seems likely that it is in the matter of teaching methods that we may perform our main service, but we may also find opportunities to help in other ways in the future.

The proper discharge of these functions (and I have touched on only a few aspects of them) demands a strong Union. We are, of course, much stronger now than we were only a few years ago thanks in no small measure to the excellent work of our indefatigable Secretary General Dr. Morf and his staff.

But I do not think we are yet strong enough for all we ought to be doing. We are, as I have already said, essentially an amateur organization. We depend on the voluntary labour of our Division, Section and Commission members and especially on their Presidents and Secretaries for the day-to-day work of the Union. The demands we now propose to make upon them in discharging our function as a source of advice and information to international bodies adds further to their burdens. It should be remembered that our Divisions are bodies which for financial and other reasons cannot meet very frequently; the Chairman and their Secretaries are often in different countries and in any case they are as a rule busy men who cannot devote more than a small proportion of their time to Union affairs. I believe that in order that our Divisions may become efficient we ought as a matter of urgency to strengthen our Secretariat in Basle by adding at least two technically competent Assistant Secretaries each of whom could act for one or more Divisions. In this way consistent records could be kept and over a period a body of information and expertise would be built up which would greatly simplify the problem of dealing promptly with requests for information and advice. This would not only ease the burden carried by Chairmen and Secretaries, but would lead, I am certain, to much greater efficiency in our operations. Although I know that not everyone will agree with me, I also believe that with such a strengthened Secretariat it would be found more practicable and more efficient as well as, in most cases, more economical, if Division and other meetings could be held as a general rule in Basle, where they could be properly serviced by the Secretariat.

All this will cost money and this is a commodity which is in short supply. At our last conference in London Prof. NOYES drew our attention to the need to aim at a substantially larger income than we have had in the past. Our income has indeed increased during my term of office and I believe that this increase which has come from industries and from governments through the national adhering bodies is a clear indication that the value of the Union is recognized. We have also during this period had the invaluable assistance of Dr. ARNOLD (USA) and his Finance Committee and of the Union Bank of Switzerland in reorganizing our finances and setting what I believe to be a sound investment policy for the Union's funds. Both the Committee and the Bank have done us a great service and I should like to place on record our gratitude to them. As a result we stand today in a better financial position than at our last Conference. But we must accept the responsibility that goes with increased support and by our efforts justify the confidence which has been placed in us by those who have given us money; if we do then I have no fears for the Union's future, for I am convinced that the necessary support will then continue to be forthcoming.

Our Conference this year has been organized with the help of our French colleagues and we are deeply indebted to the French National Committee for Chemistry not only for their invitation to us to come to Paris but for the characteristically warm welcome they have given us and for the excellent arrangements they have made. We have, however, made a change from our usual practice. This year, for the first time, we are holding the Union meeting in a different city and country from the International Congress of Pure and Applied Chemistry, which is being held this year in Moscow subsequent to this Conference and which many of us will be attending. The vast increase which has occurred not only in the range and scope of chemical research but also in the number of practising chemists has brought us to the point where all-embracing Congresses are becoming unworkable through sheer weight of numbers and the enormous expense involved. It is inevitable that Congresses will seek to limit themselves in scope and to concentrate on limited areas of chemistry probably in the form of symposia, as is indeed envisaged in

Moscow. Under these circumstances the arguments for holding a Union Conference and a Congress in one and the same place are less strong than they used to be. There are moreover important financial considerations. The location of the International Congress of Pure and Applied Chemistry (and hence also the location of the Conference) has until now been decided on the basis of invitations from the host country and this is as it should be. But when we have a Conference not only must the Bureau and Council attend, but in addition all individual members of Divisions, Sections and Commissions (a total of 400 persons at present) must attend. The cost to the Union in providing the necessary travel and subsistence for members who are attending the Conference is very heavy, and in the event of a meeting held in some city in the world remote from a majority of the members the cost could indeed be crippling. As matters stand at present—although it will not necessarily always be so—the cost is at a minimum when meetings are held in Western Europe. Essentially for these reasons we decided to try the experiment this year of holding our Conference in Paris and to time it in such a way that it would be possible for those of our number wishing to attend the Congress to proceed directly thereafter to Moscow. As compared with a joint Conference and Congress in Moscow this arrangement represents a saving of approximately $ 56000 to the Union, a saving which is extremely valuable since it enables us to devote that amount more to the work of the Union. It remains to be seen whether the experiment will be found to be a success and in the light of our experience this year it will be for the Bureau to consider whether it should be continued or whether we should revert to former practice.

This question of the expense to the Union of meetings in areas remote from Western Europe has, of course, been frequently discussed in the past. We are a world-wide organization and it is important that the Union should be active and indeed show its physical presence in as many of our constituent countries as possible. A few years ago it was decided that the most economical and effective way of doing so would be to ask the Executive Committee to hold its meetings—or at least a substantial proportion of them—in more distant places, where they might coincide with some symposium or national meeting or where a series of lectures might be given by Committee members. Following this practice the Executive Committee has met three times since the London Conference—in Basle (together with the entire Bureau), in Austin and in Canberra. We are deeply indebted to our Swiss, American, and Australian colleagues for their abundant hospitality and for all they did to make these meetings so successful.

In the course of my general reflections on the Union and its functions I have in fact touched upon the main new activities which have been initiated during the past two years. Regarding our other continuing activities I would like to draw your attention to our publications. I have already commented on the great value we attach to the work of Prof. Thompson and Prof. Weedon. The circulation of "Pure and Applied Chemistry" is growing and already it is making a contribution to the Union's income. But financial return is not, of course, the main object; much more important is the contribution our Journal and Reports can make to the chemical literature and to the esteem in which the Union is held. There have, I know, been complaints from time to time that the circulation of our Journal is not as large as it should be. Of course it is not—but let us remember that it takes time for a publication of this rather exceptional type to become established and the circulation is bound to rise slowly. But rise it will, for the quality and value of Pure and Applied Chemistry, of which 4 volumes have been published since our last Conference, is being increasingly recognized. Another feature of our publication policy has been the production of a much larger "Infor-

mation Bulletin" designed to keep chemists fully informed of Union progress and affairs. I hope that Council approves of this policy, but the Secretary General to whose efforts the Bulletin is due feels, like myself, that it does not perhaps have the circulation it should. This is a matter which should be tackled by the national adhering bodies since it is only through them that proper distribution can be made.

As your President I have been enormously helped and sustained by my fellow officers the Treasurer and the Secretary General and by my other colleagues on the Executive Committee of the Bureau. Of Dr. Morf's services, not just to myself but to the Union, I cannot speak too highly; he represents continuity in Union affairs, and to his vigour, his expertise and his selfless devotion to the Union we owe our present strong position in international science. I began my Presidency with a new Honorary Treasurer Prof. Bailar. I can assure the Council that in electing Prof. Bailar to that office it acted wisely. He has discharged his duties admirably and indeed has devoted a great deal of his energy and, I fear, of his time to ensure that our affairs remain in good shape. He is, moreover, a delightful colleague with the rare gift of making us almost enjoy being pulled up short by him when we show signs of becoming extravagant. My term of office as President terminates with this meeting and I would like quite simply but sincerely to thank all of you for your confidence, your friendship and your support. I can only hope that I have justified them and that I may continue to serve the Union in a lesser capacity. I hand on my office to Prof. Klemm, a very dear friend, an outstanding chemist, and a man who has long been a devoted worker in the cause of the Union. In his hands the Union is in safe keeping.

In conclusion may I seek once again to summarize very briefly my views on the state of the Union. We are immeasurably stronger than we were a few years ago, but to fulfil our functions properly and to justify increasing support which we are now receiving we must further streamline our organization by strengthening our Secretariat and by making our Divisional Committees more effective working bodies. This, of course, calls for greater sacrifices from our Divisional officers and a measure of centralization in administration. There may be some who fear that increasing the strength of the central Secretariat may lead to increasing bureaucracy. I believe that fear is unreal; bureaucracy must be avoided—but so must inefficiency.

Todd

RAPPORT DU PRÉSIDENT SUR LA SITUATION DE L'IUPAC

Conférence 1965 de l'IUPAC

Il y a deux ans, à Londres, le Président sortant, le Prof. NOYES, présenta dans les mêmes circonstances qu'aujourd'hui un rapport de tout premier ordre dans lequel, entre autres choses, il nous donna un compte rendu des plus instructifs sur le développement de l'Union Internationale de Chimie Pure et Appliquée et du Conseil International des Unions Scientifiques (ICSU) auquel elle adhère. Parlant de l'ICSU, il nous décrivit avec force que cette organisation devrait être puissante pour défendre les points de vue de la science tout entière et pour encourager le nombre croissant des projets internationaux inter-disciplinaires qui deviennent de plus en plus le trait dominant de la scène mondiale. La science a beaucoup souffert de la faiblesse passée de l'ICSU et c'est une grande satisfaction que de voir cette organisation en bonne voie de développement sous la conduite vigoureuse de son nouveau Président, le Professeur THOMPSON qui est un des nôtres. Il a notre appui total dans ses tentatives, et me rappelant comme je le fais avec gratitude tous les services qu'il a rendus à l'IUPAC, je suis persuadé que l'ICSU ne pourrait être en de meilleures mains.

Mais j'aimerais souligner, et peut-être développer, quelques-uns des points évoqués par le Prof. NOYES au sujet de la position de l'IUPAC. En ma qualité de Président depuis deux ans mon expérience m'a prouvé que ces questions requièrent notre attention urgente et la plus attentive. Il me semble en effet qu'il est temps de décider du sort de nos affaires.

Jusqu'en 1947, l'IUPAC n'a pas joué un rôle prépondérant dans le domaine de la chimie; il s'agissait d'une petite organisation qui, si nous voulons être honnêtes avec nous-mêmes, tenait plutôt d'un club de voyage sélect que d'une organisation scientifique efficace. Depuis lors, de nombreux changements sont intervenus, peut-être sous l'impulsion de l'activité scientifique en pleine évolution et du caractère de plus en plus technologique de notre civilisation. Quelle qu'en soit la raison, l'IUPAC s'est totalement transformée et occupe maintenant une place de plus en plus importante dans l'activité internationale chimique, et c'est là une bonne chose, car dans un monde tellement dominé par la science et la technologie des Unions telles que la nôtre, qui ne sont ni politiques ni gouvernementales, ont un rôle de tout premier rang à jouer. Avec l'accroissement de nos activités et de notre importance nous avons pris aussi des dimensions plus grandes – non seulement par le nombre des pays adhérents, mais aussi par le nombre de nos Divisions, Sections et Commissions. Notre budget, sans les subventions de l'UNESCO, s'est accru substantiellement (de $5000 en 1947 à $100000 en 1965) grâce à l'aide généreuse apportée par l'augmentation des souscriptions et les dons volontaires des pays membres, et grâce à la générosité de nos amis de l'industrie chimique; nous leur en sommes immensément reconnaissants. Malgré tout notre situation reste précaire et nous ne pouvons pas considérer notre avenir comme assuré. L'aide financière dont nous avons besoin en sera acquise que si nous savons prouver que nous pouvons nous acquitter de notre tâche d'Union. Nous nous trouvons aujourd'hui dans une situation qui n'est pas étrangère aux organisations en expansion, en ce sens que nous sommes arrivés au stade où nos manières de faire traditionnelles ne conviennent pas, dans tout les cas, à une organisation réellement importante et nous devons être prêts à apporter quelques modifications à notre manière d'agir. Nous sommes maintenant sur le point d'entreprendre le premier pas dans ce sens. Lors de notre dernière Conférence un nouveau projet de

Statuts a été présenté, visant à nous donner la souplesse structurale nécessaire en période de changements rapides dans laquelle nous vivons. Ces Statuts, provisoirement adoptés, ont été depuis minutieusement reconsidérés par un Comité spécial, et les modifications qui je l'espère les rendent finalement prêts à la ratification sont devant nous à la présente Conférence; nous devons beaucoup au Dr D.C. Martin (Royaume-Uni) et à son Comité pour les précieux services qu'ils ont rendus à l'IUPAC en révisant le projet des nouveaux Statuts. Mais le fait d'avoir des Statuts souples n'est pas suffisant. Nous devons nous poser la question de savoir quelles sont les fonctions propres de l'IUPAC et quelle est la façon la plus efficace de s'en acquitter. Il y a quelques années notre ancien Président, le Prof. Tiselius, avait conclu, plutôt avec regret, qu'on ne pouvait guère s'attendre à voir l'Union jouer autre chose qu'un rôle de second plan, du fait que les questions les plus importantes seraient réglées soit par les organisations nationales ou intergouvernementales. Il avait incontestablement raison à l'époque vu la situation de l'IUPAC à ce moment là. Mais je ne pense pas que ce point de vue soit maintenant valable, étant donné que l'IUPAC cherche réellement à faire de son mieux dans le domaine qui lui est imparti et elle doit mener à bonne fin une tâche qui n'est pas facile. Je pense vraiment que l'étonnante augmentation de l'influence de l'IUPAC au cours de ces dix dernières années témoigne à mon sens que le futur de l'IUPAC dépend de nous. A mon avis, les fonctions de l'IUPAC aujourd'hui peuvent être définies en termes généraux comme suit:

1° Encourager l'étude et l'application de la chimie sur le plan international en réunissant les chimistes de toutes les branches de différents pays, en vue de faciliter l'échange d'informations et de favoriser les réunions, symposia et conférences traitant de questions d'ordre chimique.

2° Rechercher un accord international en ce qui concerne les questions de toute première importance pour la chimie, comme, par exemple, la nomenclature, les constantes, les méthodes analytiques etc..., et fournir une source de conseils faisant autorité pour les autres organisations internationales intéressées par les normes et les données.

3° Donner avis et assistance aux pays en voie de développement pour les questions concernant la formation des chimistes.

Ces fonctions sont énoncées telles qu'elles se présentent à l'esprit, mais ne sont pas classées par ordre d'importance. Il va de soi qu'un service efficace de publications serait le complément nécessaire aux trois points énumérés ci-dessus.

La première de ces fonctions que j'ai mentionnées est celle sur laquelle notre attention croissante s'est penchée au cours de ces dernières années, et le succès obtenu en patronnant des symposia, et l'importance croissante de nos publications en sont la meilleure récompense. Pour la perfection de notre journal «Chimie Pure et Appliquée» nous sommes grandement redevables envers le Prof. Thompson, Président du Comité de Rédaction, et spécialement envers notre éditeur le Prof. Weedon. J'aimerais saisir cette opportunité de les remercier, en notre nom à tous, de même que les éditeurs MM. Butterworths & Co. Ltd., de tous leurs efforts. Les membres du Bureau et du Comité Exécutif pensent depuis quelque temps qu'en dépit de la grande activité de notre Division de Chimie appliquée, il est cependant nécessaire de rechercher un contact plus étroit entre l'IUPAC et l'industrie chimique, de même qu'il convient d'étendre les contacts entre les chimistes eux-mêmes des différentes industries. En conséquence, pendant mon mandat présidentiel, j'ai invité le Dr Connor de Rohm & Haas Inc., USA, à constituer un Comité ad hoc composé des dirigeants les plus éminents

des grandes industries chimiques et à examiner avec ce Comité d'une manière générale comment l'IUPAC pourrait mieux servir l'industrie. Le Dr Connor accepta volontiers et nous lui sommes reconnaissants, ainsi qu'à ses collègues, de la peine qu'ils ont prise à se rencontrer non seulement une fois, mais à plusieurs reprises ce qui ne leur était pas toujours facile, et de nous avoir fourni un rapport qui comporte de nombreuses suggestions valables que nous mettons maintenant à exécution. Une proposition spécifique a été faite: l'IUPAC devrait s'efforcer de réunir les chimistes industriels en organisant un symposium spécial portant sur un ou plusieurs sujets industriels. Il est évident que le temps n'a pas permis d'organiser cette manifestation en 1965, mais j'espère que nous pourrons la mettre sur pied quelque part en Europe Occidentale en 1966.

Au cours de ces dernières années, nous avons assisté à un accroissement soutenu du nombre des symposia internationaux portant sur des sujets ayant trait à la chimie, et la question du patronage de l'IUPAC a été un souci constant pour le Comité Exécutif et le Bureau; je pense que le temps est venu de regarder en face ce problème, car si nous ne parvenons pas à définir clairement l'attitude de l'IUPAC à ce sujet et à nous y tenir, l'IUPAC court à sa perte ou risque de voir son influence anéantie par le développement de groupes qui rechercheraient leur indépendance. Il est nécessaire que l'IUPAC s'efforce de ne patronner que les symposia qui présentent un intérêt certain et qui traitent de questions d'actualité pour la chimie; à mon avis, elle ne devrait pas accepter la responsabilité de fournir un support financier aux symposia qui ont lieu à intervalles réguliers – du moins elle ne le peut à longue échéance. C'est là un point que le Bureau doit examiner d'urgence, mais je suis persuadé que la solution du problème réside dans les Comités de Divisions qui doivent faire preuve de dynamisme pour l'identification des sujets intéressants et encourager ou amorcer un développement régulier de symposia sous le patronage de l'IUPAC. S'ils ne peuvent assurer cette responsabilité il en résultera de lourdes conséquences pour l'IUPAC. La deuxième fonction de l'IUPAC que j'ai indiquée, et qui concerne les normes et accords internationaux, présente deux aspects. Le premier de ces aspects concerne généralement les questions sur lesquelles nous nous penchons depuis longtemps et que nous pouvons résoudre nous-mêmes. Je me réfère naturellement aux questions telles que nomenclature, poids atomiques, données et constantes, etc... Je pense que nous nous acquittons bien de cette tâche grâce aux efforts soutenus et au travail assidu, bien que dans l'ombre, de nos Commissions. Pour le second aspect, nous n'avons cependant pas fait ce que nous aurions dû. Depuis de nombreuses années l'Organisation Internationale de Normalisation (ISO) a dû établir des normes internationales pour la chimie, concernant spécialement le commerce et l'industrie et surtout parce que depuis la dernière guerre il y a eu une augmentation très nette du nombre des organisations internationales pour lesquelles des problèmes d'ordre chimique se posent (par exemple les organisations dépendant des Nations Unies telles que l'Organisation pour l'Alimentation et l'Agriculture (FAO), l'Organisation Mondiale de la Santé (OMS), etc...). Toutes ces organisations ont besoin des meilleurs conseils et d'aide chimiques, et il appartient certainement à l'IUPAC de leur procurer cette assistance. Il est évident que nous ne pouvons faire le travail de ces organisations. Le fait de mener le travail d'investigation demandé par n'importe laquelle de ces organisations serait une lourde charge financière; il est clair que cette mission doit être accomplie à l'échelon gouvernemental. Nous sommes de toute façon une organisation d'amateurs, dépendant presque entièrement des services volontaires des membres de nos Divisions, Sections et Commissions. Mais pour cette même raison nous sommes également une organisation désintéressée et c'est pourquoi nos conseils sont tant recherchés et que nous

devrions être en mesure de les donner. En réalité, par l'intermédiaire de nos Divisions nous devrions pouvoir donner des conseils lorsque nous sommes sollicités ou indiquer à quelle source s'adresser pour les obtenir. Je crois que nous devons le faire bien que là encore ce soit une charge supplémentaire imposée aux Divisions et spécialement à leurs Présidents et Secrétaires, ce qui entraînera également une expansion et un renforcement de notre secrétariat central. Des dépenses en résulteront, mais nous trouverons les fonds nécessaires si nous entreprenons ce travail sérieusement, et ce serait de l'argent sagement dépensé. Il sera nécessaire d'agir dans ce sens si nous devons remplir nos obligations de membre de l'ICSU, étant donné que cet organisme a accepté, sur demande de l'UNESCO, de donner des conseils à cette dernière en ce qui concerne les sujets scientifiques et l'IUPAC devra inévitablement apporter son concours pour la chimie.

Notre troisième fonction – qui consiste à assister les pays en voie de développement – est actuellement de première importance. Pour venir à bout de cette tâche, il a été constitué, sous la présidence du Prof. NYHOLM (Royaume-Uni), un Comité sur l'Enseignement de la Chimie ayant toute liberté d'action; ce Comité s'est mis avec ardeur à l'ouvrage et nous attendons beaucoup de lui. Il semble que ce soit dans le domaine des méthodes d'enseignement que nous pouvons accomplir l'essentiel de notre tâche, mais nous pouvons aussi trouver des opportunités pour une aide future dans d'autres domaines.

Pour bien s'acquitter de ces fonctions (et je n'ai fait qu'ébaucher certains de leurs aspects) il est nécessaire que l'IUPAC soit puissante. Il est certain que nous sommes maintenant plus forts qu'il y a quelques années, et nous le devons en grande partie à l'excellent travail de notre infatigable Secrétaire Général, le Dr MORF, et de son personnel. Mais je pense que nous ne sommes pas encore assez forts pour faire face à tout ce que nous devrions faire. Ainsi que je l'ai déjà dit, nous faisons essentiellement du travail d'amateurs. Nous dépendons du travail volontaire des membres de nos Divisions, Sections et Commissions, et spécialement de leurs Présidents et Secrétaires, pour le travail courant de l'IUPAC. Les demandes que nous avons l'intention de leur transmettre afin de nous acquitter de notre fonction comme source d'avis et d'informations pour les organisations internationales s'ajouteront à leur fardeau. Il est nécessaire de rappeler que nos Divisions sont des organes qui, pour des raisons financières et autres, ne peuvent se rencontrer très fréquemment; les Présidents et leurs Secrétaires, souvent séparés par la distance, et de toute façon exerçant déjà une grande activité en dehors de l'IUPAC, ne peuvent de ce fait consacrer qu'une petite partie de leur temps aux affaires de l'IUPAC. Afin de rendre nos Divisions plus efficaces je pense que nous devrions renforcer d'urgence notre secrétariat de Bâle par l'engagement d'au moins deux assistants techniquement compétents, chacun ayant la charge d'une ou plusieurs Divisions. Les dossiers seraient alors tenus à jour et deviendraient une source d'informations et d'expertises simplifiant ainsi grandement le problème des demandes d'informations et d'avis auxquelles il serait répondu rapidement. Cela n'aurait pas seulement l'avantage d'alléger la tâche des Présidents et Secrétaires, mais conduirait, j'en suis certain, à une efficacité accrue de nos opérations. Bien que je sache que tout le monde ne partagera pas mon opinion, je pense également qu'avec un tel secrétariat renforcé il serait plus pratique et plus efficace, de même que dans la plupart des cas plus économique, que les réunions des Divisions et autres réunions eussent lieu en règle générale à Bâle où elles pourraient recevoir l'aide du secrétariat.

Tout cela représentera des dépenses et nous n'avons pas trop d'argent. Lors de notre dernière conférence à Londres, le Prof. NOYES a attiré notre attention sur la nécessité d'aboutir à un revenu substantiellement plus

important que celui que nous avons eu dans le passé. Nos revenus ont augmenté durant mon mandat de Président et je suis persuadé que cette augmentation que l'on doit aux industries et aux Gouvernements par l'intermédiaire des organisations nationales adhérentes indique clairement que la valeur de l'IUPAC est reconnue. Nous avons aussi durant cette période bénéficié de l'assistance inestimable du Dr Arnold (USA) et de son Comité financier, et de l'Union de Banques Suisses, pour la réorganisation de nos finances et pour mettre sur pied ce que j'estime être une politique d'investissements sûre des fonds de l'IUPAC. Le Comité et la Banque nous ont tous deux rendu grand service et je désire exprimer notre gratitude à leur égard. Le résultat est que nous sommes maintenant dans une situation financière meilleure que celle qui existait lors de la dernière conférence. Mais nous devons accepter la responsabilité qui va de pair avec un support financier accru, et grâce à nos efforts, justifier la confiance qui nous a été témoignée par ceux qui nous ont financés; si nous le faisons je ne redoute pas l'avenir de l'IUPAC, car je suis convaincu que l'aide financière viendra d'elle-même.

Cette année notre Conférence a été organisée avec l'aide de nos collègues français et nous avons une grande reconnaissance envers le Comité national français de la Chimie, non seulement pour nous avoir conviés à Paris, mais pour l'accueil particulièrement charmant qui nous a été réservé et pour les excellents arrangements que nous lui devons. Nous avons cependant apporté un changement à notre pratique habituelle. Pour la première fois cette année la Conférence de l'IUPAC a lieu dans une ville et un pays différents de ceux du Congrès International de Chimie Pure et Appliquée qui se tiendra cette année à Moscou immédiatement après la présente Conférence, et auquel beaucoup d'entre nous participeront. La grande évolution qui s'est produite non seulement dans le domaine de la recherche chimique, mais aussi dans le nombre des chimistes en exercice, nous a conduits au stade où les congrès qui englobent tous les sujets deviennent impraticables en raison de leur nombre et des énormes dépenses qu'ils entraînent. Il est inévitable que les Congrès chercheront à se limiter et à se concentrer sur des domaines déterminés de la chimie, probablement sous la forme de symposia, ainsi qu'il l'est envisagé pour Moscou. Dans ces conditions, les arguments pour tenir une Conférence de l'IUPAC et un Congrès dans un seul et même lieu sont moins forts que par le passé. Il y a néanmoins des considérations financières importantes. Le lieu du Congrès International de Chimie Pure et Appliquée (et désormais aussi le lieu de la Conférence) a jusqu'à présent été décidé sur la base des invitations reçues de la part du pays nous accueillant, comme cela doit être. Mais quand nous avons une conférence il ne faut pas seulement tenir compte de la participation du Bureau et du Conseil mais en plus de tous les membres individuels des Divisions, Sections et Commissions (cela représente actuellement un total de 400 personnes). L'IUPAC doit faire face aux frais de voyage et de séjour des membres qui participent à la conférence, ce qui représente de lourdes dépenses, et dans le cas d'une réunion qui se tiendrait dans quelque ville du monde éloignée pour la majorité des membres, les dépenses ne feraient que croître. En ce qui concerne la situation actuelle – bien qu'elle ne doive pas nécessairement rester telle quelle – les dépenses sont réduites au minimum lorsque les réunions ont lieu en Europe occidentale. Essentiellement pour ces raisons nous avons décidé cette année de tenter l'expérience de tenir notre Conférence à Paris et de fixer la date en sorte qu'il serait possible à ceux de nos membres désireux de participer au Congrès de se rendre directement à Moscou. Si l'on compare cet arrangement avec celui de la Conférence et du Congrès à Moscou il en ressort une économie approximative de $56 000 pour l'IUPAC, économie qui est loin d'être négligeable, car elle nous permet de consacrer

le montant ainsi économisé à l'activité de l'IUPAC. Il reste à savoir si cette expérience s'avérera un succès, et à la lumière du résultat obtenu cette année il appartiendra au Bureau d'estimer s'il y a lieu de continuer dans ce sens ou s'il convient de revenir à l'ancien système.

Cette question des dépenses qui incombent à l'IUPAC pour les réunions tenues dans des régions éloignées de l'Europe occidentale a bien sûre été fréquemment discutée dans le passé. Etant une organisation universelle il est important que l'IUPAC soit active et montre sa présence réelle dans le plus grand nombre de ses pays membres. Il y a quelques années il a été décidé que la manière la plus économique et la plus efficace d'agir dans ce sens serait de demander au Comité Exécutif de tenir ses réunions – du moins beaucoup d'entre elles – dans des villes lointaines où elles peuvent coïncider avec quelque symposium, réunion nationale et où une série de conférences pourraient être données par les membres du Comité. Suivant ce conseil, le Comité Exécutif s'est réuni trois fois depuis la Conférence de Londres – à Bâle (en même temps que la totalité du Bureau), à Austin (Texas) et à Canberra. Nous sommes très reconnaissants envers nos collègues suisses, américains et australiens pour leur merveilleuse hospitalité et pour tout ce qu'ils ont fait afin que ces réunions soient une réussite.

En exposant mes réflexions générales sur l'IUPAC et ses fonctions j'ai en fait esquissé les principales nouvelles activités qui ont été entreprises depuis les deux dernières années. Quant à nos autres activités permanentes je souhaite attirer votre attention sur nos publications. J'ai déjà dit tout le bien que je pensais du travail des Prof. Thompson et Weedon. Le journal «Chimie Pure et Appliquée» progresse et contribue déjà à renforcer le revenu de l'IUPAC. Mais le bénéfice n'est pas l'objectif principal; mais c'est la contribution que notre journal et nos rapports peuvent fournir à la littérature chimique et à l'estime portée à l'IUPAC qui est le plus important. Je n'ignore pas qu'il y a eu des doléances de temps en temps à propos de la diffusion de notre journal qui n'est pas aussi large qu'elle le devrait. Naturellement ce n'est pas le cas – mais il convient de ne pas oublier que cela prend du temps pour la publication d'un journal de ce genre plutôt exceptionnel d'être connu et sa diffusion ne progressera que lentement. Mais il progressera, car la qualité et la valeur du journal «Chimie Pure et Appliquée», dont quatre volumes ont été publiés depuis notre dernière conférence, sont de plus en plus appréciées. Un autre aspect de notre politique de publication a été la production d'un «Bulletin d'Information» plus important visant à tenir les chimistes parfaitement informés du progrès et des affaires de l'IUPAC. J'espère que le Conseil approuvera cette politique, mais le Secrétaire Général qui a consacré au Bulletin tous ses efforts estime, comme moi-même, que le Bulletin n'a pas la diffusion qu'il mérite. C'est là une question qui devrait être examinée par les organisations nationales adhérentes, car une diffusion convenable ne peut être assurée que par leur intermédiaire.

En tant que Président de l'IUPAC, j'ai été considérablement aidé et soutenu par mes collègues, le Trésorier et le Secrétaire Général, et par mes autres collègues du Comité Exécutif et du Bureau. Je ne saurais jamais exprimer assez de reconnaissance au Dr Morf pour les services qu'il a rendus, non seulement à moi-même, mais à l'IUPAC tout entière; il représente la continuité dans les affaires de l'IUPAC, et nous devons à son dynamisme, à son expérience et à son dévouement sans borne que l'IUPAC occupe sa forte position actuelle dans la science internationale. Lorsque j'ai pris la présidence de l'IUPAC, le Prof. Bailar était désigné comme Trésorier. Je puis assurer le Conseil qu'il a agi sagement en élisant le Prof. Bailar à ce poste. Il s'est admirablement acquitté de ses devoirs et a consacré une grande partie de son énergie et je crains aussi de son temps pour maintenir nos affaires en bon ordre. Il est de plus un merveilleux collègue qui a le

don rare de nous ramener à la réalité lorsque nous montrons des signes d'extravagance et de le faire d'une telle manière que nous l'acceptions avec le sourire. Mon mandat de Président s'achève avec la présente réunion et je voudrais simplement vous remercier sincèrement de la confiance que vous m'avez témoignée, de votre amitié et de votre soutien. Je ne puis qu'espérer les avoir mérités et pouvoir continuer à servir l'IUPAC à un échelon moins en vue. Je transmets mes pouvoirs au Prof. KLEMM, un ami très cher, chimiste distingué, et un homme qui s'est depuis longtemps consacré à la cause de l'IUPAC. L'IUPAC est en sécurité entre ses mains.

En conclusion, puis-je une fois encore résumer très brièvement mes vues sur la situation de l'IUPAC. Nous sommes sans contestation plus forts qu'il y a quelques années, mais afin de remplir nos obligations et justifier le soutien financier accru que nous recevons maintenant, nous devons nous efforcer d'améliorer notre organisation en renforçant notre secrétariat et en rendant plus efficaces nos Comités de Division. Cela, bien sûr, ne se réalisera pas sans de plus grands sacrifices des membres de nos Divisions et sans quelque centralisation administrative. Certains craindront peut-être que le fait de renforcer le secrétariat central conduise à une bureaucratie supplémentaire. Je pense que cette crainte n'est pas justifiée; la bureaucratie doit être évitée, mais l'inefficacité aussi.

TODD

BIENNIAL REPORT OF THE HONORARY TREASURER 1963/64

(1) INTRODUCTION

The Union has always had to rely upon its friends for help—and it always will. Until recently, the members of commissions and other bodies of the Union not only devoted a great deal of time and effort to their activities in the Union, but they had also to pay their way to the meetings. This kept many able people from participating. Starting with the XXIst Conference, which was held in Montreal in 1961, the travel and subsistence expenses of titular members have been paid by the Union. (There are a few exceptions. These will be mentioned later.) This has resulted in much better attendance at the meetings and more effective work on the part of the commissions. Unfortunately, it has also raised serious financial problems, for the commissioners live in widely separated parts of the world, and travel is expensive. We have come to expect that the Union will run large deficits in the years in which conferences meet. These deficits must be made up by an excess of income over expenditures in non-conference years.

The plan of using income from non-conference years to cover deficits from conference years, however, cannot continue indefinitely, for the commissions and committees of the Union are becoming increasingly active, and, if they are to exert a strong influence (as we hope they will), it is necessary for them to meet in non-conference years, as well as at the conferences. It has been found, too, that the Divisions operate much more successfully if the divisional officers meet once each year. Finally, the Union is accepting new responsibilities and undertaking new and useful activities. This requires the appointment of new commissions or committees, the members of which must be brought together occasionally. The Committee on the Teaching of Chemistry exemplifies this trend.

Clearly, the Union must find new sources of income, or curtail its activities, which means leaving important work undone. Some money can be saved by strict economy measures, and plans to make such savings will be mentioned later in this report. However, the savings to be effected cannot improve our situation very much.

(2) FINANCE COMMITTEE

At the Conferences in Munich, Montreal, and London, *ad hoc* Finance Committees were appointed to study the financial policies of the Union and make recommendations to the Council on them. These committees had some good influence, but it became apparent that the task of advising the officers of the Union on financial matters could not be discharged adequately by a committee that existed for only a few weeks and met only once in its entire career. The *ad hoc* committee therefore recommended to the Council in London that a standing Committee on Finance be appointed. This recommendation was accepted, and the Committee has already become an important part of the IUPAC organization. It has investigated our tax status and our investments, and has made some studies of sources of

increased income for the Union. Under the energetic and able leadership of Mr. PHILIP ARNOLD (USA), the Committee consists of Sir CHARLES DODDS (England), C.A. GABRIELSON (Sweden), OTTO HORN (Germany) and RUDOLF MORF (Switzerland).

(3) INCOME

The Union continues to receive a small subvention from UNESCO, by way of ICSU ($ 14000 in 1965).

The major portion of the Union's cash income is derived from contributions from the adhering bodies or the governmental organizations which sponsor them. These bodies are grouped into four categories (eight subcategories), based on the annual contributions which they make. These categories, with the number of adhering bodies currently in each, are as follows:

Category A4	$ 25 000	None
Category A3	$ 10 000	3 adhering bodies
Category A2	$ 5 000	1 adhering body
Category A1	$ 2 600	10 adhering bodies
Category B2	$ 1 600	1 adhering body
Category B1	$ 800	9 adhering bodies
Category C	$ 450	11 adhering bodies
Category D	$ 100	3 adhering bodies

During the 1963–64 biennium, Germany moved from Category A2 to A3, Denmark from B2 to A1, and Sweden from Category A1 to A2. The Union is most grateful to these countries, and hopes that others will increase their contributions as they find it possible. None of the adhering bodies have yet entered Category A4, but there is strong hope that the United States will be able to do so soon. The addition of Cuba, Greece, Mexico, New Zealand, Nigeria and Venezuela as members will bring added income, too, though it will also involve additional responsibilities and expenses.

All but three of the adhering bodies have paid their dues for 1964, but two have not yet paid for 1963.

Funds received from the adhering organizations are augmented by cash gifts. During the year 1963 and 1964, these were

1963: $ 20 000: USA
1964: $ 8 370 (£ 3000): UK
$ 5 000: Germany
$ 2 400: Sweden
$ 1 000: Denmark

The first of these will probably not be repeated, and the sum indicated must be forthcoming from other sources if the Union is not to dip into its reserves.

(4) BUDGET

It is difficult to present a "realistic" budget, for a large portion of the income of the Union is intangible and difficult to assess. Some such items are

(a) The help of the four Swiss chemical companies—Ciba, Geigy, Hoffmann-La Roche and Sandoz—in supplying office expenses for the Secretary-General and his staff.
(b) The management of IUPAC finances by the Union Bank of Switzerland at no cost to IUPAC. (It has been agreed that hereafter the Union will pay a nominal sum of $ 800 per year.)
(c) Travel and subsistence support for experts which is paid directly by member countries, in their own currencies.
(d) Travel and subsistence support by industrial companies whose employees are involved in IUPAC affairs.
(e) Voluntary contributions of travel and subsistence expenses by some officers of the Union and its Divisions.

The Union is most grateful for this help and wishes to express its thanks to all who have contributed. Conservatively, the items mentioned would be worth at least $70000. In calculating the real income of the Union, this sum should be added to the amounts received in cash. Corresponding figures would, of course, be added to the list of expenditures.

There is a constant concern over the stability of these contributions, for there is no assurance that they will continue indefinitely. If any of them is withdrawn, the Union will find itself in straitened circumstances indeed. It is therefore important that additional sources of support or potential support be located. At present, only two such sources seem possible—increased dues, and broadly based contributions from individuals, corporations, and national bodies. It is generally felt that at the present time it would be difficult, but not impossible, to increase the income markedly from either of these sources.

(5) TAXES AND INVESTMENTS

Throughout its history, the Union has invested its reserve funds through Baring Bros. in London, which has also held the securities. The income from these investments, amounting to some $6000 per year, has been subject to British income tax of about $2500. The officers of the Union have repeatedly sought relief from this tax on the basis that IUPAC is a non-profit educational organization, but these efforts have been uniformly unsuccessful. At its meeting in March, 1964, therefore, the Bureau voted to withdraw the account from London and replace the investments in Britain by investments in countries which would not impose an income tax.

It was also agreed that the ruling adopted in Montreal, restricting investment of the reserve fund to stocks of the chemical industry, was unnecessarily restrictive, and it was rescinded.

The Bureau also agreed that the gold brick which IUPAC purchased some years ago should be sold and that the proceeds should be invested in stocks.

Most of these transactions were completed before the end of 1964. A list of the stocks presently held is given in Schedule A.

(6) FINANCIAL RESPONSIBILITY

When the Union was small, and delegates paid their own way to its meetings, the financial transactions of the Union were simple and could be managed successfully in a rather informal way. This is not possible in a large organization with an annual cash flow of more than \$100000. The Treasurer therefore proposes to adopt rather strict rules on financial commitments and budget control.

In the past, division officers and commission chairmen have sometimes made financial commitments (or have made encouraging statements that were interpreted to be commitments), even though they had no authority to do so. Such commitments have been honored by the Union, but sometimes with much embarrassment. In the future, no commitment shall be binding on the Union unless it has been approved as part of the budget or by action of the Executive Committee.

It is requested that the Secretary of each division keep simple accounts so that he can report exact expenditures, and so that he will know when expenditures in any budget category are approaching the limit. If it develops that moneys allocated to one category in a divisional budget should be shifted to another category, the Treasurer should be consulted.

All expenses should, of course, be kept as low as is consistent with efficient operation. Committee meetings should not be held if the matters to be discussed can be handled by mail. Travel for which reimbursement is to be sought must be by "economy class" by the most direct route. If a saving can be effected by the purchase of a round trip ticket, this should be done.

It is hoped that committees will arrange to hold their meetings in cities which will involve the least total travel cost, and that committee chairmen will find meeting rooms for which no charge will be made. This can usually be effected by using rooms belonging to a chemical society, or in a university.

In closing this report, the Treasurer wishes to extend heartfelt thanks to Mr. G. Hanselmann, Mr. H. Baumann and Dr. J. Rakowski of the Union Bank of Switzerland for their invaluable aid to him and to IUPAC.

John C. Bailar, Jr.
Treasurer

RAPPORT BISANNUEL DU TRÉSORIER 1963/64

1° INTRODUCTION

L'IUPAC a toujours dû compter – et comptera toujours – sur l'aide de ses amis. Jusqu'à une date récente, les membres des Commissions et autres organes de l'IUPAC consacraient non seulement une grande partie de leur temps et de leurs efforts aux activités de l'IUPAC, mais s'ils désiraient assister aux réunions ils devaient voyager à leurs frais. Ceci a écarté la participation de nombreuses personnes compétentes. A partir de la XXI[e] Conférence, qui eut lieu à Montréal en 1961, les frais de voyage et de séjour ont été remboursés par l'IUPAC (à quelques exceptions près, dont il sera fait mention plus loin). Cette politique s'est traduite par une participation accrue aux réunions et par un travail plus efficace des Commissions. Malheureusement, il en a résulté de sérieux problèmes financiers du fait que les membres dont il s'agit sont répartis à travers le monde, d'où des frais de voyage élevés. Nous en sommes arrivés à prévoir, les années où la Conférence est organisée, un déficit important pour l'IUPAC. Ces déficits doivent être compensés, au cours des années sans conférence, par un excédent des recettes sur les dépenses.

Le principe qui consiste à utiliser le revenu des années sans Conférence pour couvrir les déficits résultant de ces manifestations ne peut cependant pas se poursuivre indéfiniment. En effet, les Commissions et Comités de l'IUPAC deviennent de plus en plus actifs, et s'ils doivent exercer une grande influence (ainsi que nous l'espérons), il est nécessaire qu'ils se réunissent aussi bien au cours des années sans conférence que dans le cadre de la Conférence. Il est également certain que les Divisions parviendront à de meilleurs résultats si leurs membres se rencontrent une fois par an. De plus, l'IUPAC a accepté de nouvelles responsabilités et a entrepris des activités utiles. Le Comité sur l'Enseignement de la Chimie illustre cette tendance.

L'IUPAC doit donc trouver de nouvelles sources de revenus, ou restreindre son activité, cette dernière attitude consistant à laisser le travail inachevé. Il est possible de réaliser des économies grâce à des mesures restrictives sévères; la façon de parvenir à de telles économies sera exposée plus loin. Cependant, ces économies ne peuvent améliorer beaucoup notre situation.

2° COMITÉ FINANCIER

Lors des Conférences à Munich, Montréal et Londres, des Comités financiers ad hoc ont été constitués pour étudier la politique financière de l'IUPAC et faire des recommandations à ce sujet au Conseil. Ces Comités ont eu quelque influence heureuse, mais il s'est avéré que la tâche de conseiller les représentants de l'IUPAC ne pouvait être assurée d'une façon adéquate par un Comité dont l'existence était limitée à quelques semaines et qui ne tiendrait qu'une seule réunion au cours de cette période. Le Comité ad hoc en fonction alors recommanda donc au Conseil réuni à Londres de constituer un Comité financier permanent. Cette suggestion fut acceptée, et ce Comité tient une place importante dans l'organisation de l'IUPAC. Il a mené un travail d'investigation sur notre situation fiscale et sur nos investissements, et a examiné la possibilité d'accroître les revenus de l'IUPAC. Sous le leadership

énergique et compétent de M. Philip Arnold (USA), ce Comité est composé de Sir Charles Dodds (Angleterre), du Dr C.A. Gagrielson (Suède), du Prof. Otto Horn (Allemagne) et du Dr R. Morf (Suisse).

3° REVENU

L'IUPAC continue de recevoir, par l'intermédiaire de l'ICSU, une petite subvention de l'UNESCO ($14000 en 1965).

La plus grande partie du revenu de l'IUPAC provient des contributions payées par les organisations adhérentes ou par les organisations gouvernementales dont elles dépendent. On distingue quatre catégories d'adhésion, elles-mêmes subdivisées en sous-catégories (huit en tout) basées sur le montant des contributions annuelles versées par les organisations adhérentes. Ces catégories, ainsi que le nombre d'Organisations adhérentes qu'elles comportent, sont à l'heure actuelle les suivantes:

Catégorie	Montant en $	Nombre d'organisations adhérentes
A4	25 000	Aucune
A3	10 000	3
A2	5 000	1
A1	2 600	10
B2	1 600	1
B1	800	9
C	450	11
D	100	3

Au cours des années 1963–64, l'Allemagne est passée de la catégorie A2 à la Catégorie A3, le Danemark de la catégorie B2 à A1 et la Suède de la catégorie A1 à A2. L'IUPAC est très reconnaissante envers ces pays et espère que d'autres suivront cet exemple s'ils en ont la possibilité. Aucune des organisations adhérentes n'a jusqu'à présent accédé à la catégorie A4, mais il est possible que les Etats-Unis y parviennent bientôt. L'adhésion récente de Cuba, de la Grèce, du Mexique, du Nigeria, de la Nouvelle-Zélande et du Venezuela apportera un revenu nouveau, bien qu'elle entraînera des responsabilités et des dépenses supplémentaires.

Toutes les Organisations adhérentes, sauf trois d'entre elles, ont réglé leur cotisation au titre de l'année 1964, mais deux n'ont pas encore payé la leur pour 1963.

Des dons en espèces viennent s'ajouter aux fonds versés par les Organisations adhérentes. Pour les années 1963–1964, ces dons ont été les suivants:

1963:	$20 000	en provenance des Etats-Unis
1964:	$ 8 370 (£3000)	en provenance du Royaume-Uni
	$ 5 000	en provenance de l'Allemagne
	$ 2 400	en provenance de la Suède
	$ 1 000	en provenance du Danemark

Le premier de ces dons ne se renouvellera probablement pas, et une somme de cet ordre devra être trouvée ailleurs, afin d'éviter que l'IUPAC ne puise dans ses réserves.

4° BUDGET

l est difficile de présenter un budget «réel», une grande partie des revenus le l'IUPAC étant des biens incorporels difficiles à évaluer. Les biens dont il 'agit sont:

a) La contribution des quatre firmes chimiques suisses – Ciba, Geigy, Hoffmann-La Roche et Sandoz – qui supportent les dépenses du Secrétaire Général et de son personnel.
b) La gestion des finances de l'IUPAC, assurée gratuitement par l'Union de Banques Suisses (l'IUPAC devra cependant faire un geste et prévoir une somme de $800 par an à cet effet).
c) Les frais de voyage et de séjour remboursés directement à leurs délégués par les pays membres, dans l'unité monétaire du pays en cause.
d) Les frais de voyage et de séjour remboursés par les firmes industrielles à ceux de leurs employés ayant un rôle à jouer dans les affaires de l'IUPAC.
e) Les contributions volontaires pour ces mêmes frais, de quelques représentants de l'IUPAC et des Divisions.

L'IUPAC apprécie grandement cette aide et souhaite exprimer ses remerciements à tous ceux qui y contribuent. Si l'on se réfère aux années précédentes, les frais mentionnés plus haut atteignent au moins $70000. Pour obtenir le revenu réel, cette somme devrait s'ajouter aux montants reçus en espèces. Cette même somme devrait évidemment figurer sous les dépenses.

Nous n'avons aucune certitude quant à la stabilité de ces contributions, et il existe une préoccupation constante à ce sujet. Au moindre retrait, l'IUPAC se trouvera dans une situation pécuniaire vraiment difficile. Il est donc important de trouver des ressources supplémentaires, sinon une aide potentielle constante. A l'heure actuelle on peut envisager deux solutions – augmentation des droits et contributions fixes pour les particuliers, firmes et organisations nationales. Il semble qu'il serait difficile, mais pas impossible, en utilisant l'une ou l'autre de ces mesures, d'augmenter substantiellement le revenu.

5° TAXES ET INVESTISSEMENTS

Depuis son origine, l'IUPAC a investi ses réserves par l'intermédiaire de la Banque Baring Bros. de Londres, qui a également détenu les titres de l'IUPAC. Le revenu tiré de ces investissements, environ $6000 par an, était soumis à l'impôt sur le revenu en vigueur en Grande-Bretagne, cet impôt atteignant environ $2500 par an. Les représentants de l'IUPAC n'ont cessé de chercher à obtenir une exonération de cette taxe, en se basant sur le fait que l'IUPAC est une organisation éducative, sans but lucratif. Tous ces efforts ont été vains. Lors de sa réunion en mars 1964, le Bureau décida donc le retrait du compte de Londres, et de remplacer les investissements effectués en Angleterre, par des placements dans d'autres pays où l'exonération de l'impôt sur le revenu serait accordée.

Il fut également décidé de supprimer la règle adoptée à Montréal, qui consistait à limiter les investissements du fonds de réserve en des titres des industries chimiques, cette règle s'étant avérée inutilement restrictive.

Le Bureau décida également de vendre le lingot d'or acquis quelques années auparavant par l'IUPAC, et de transformer le fruit de cette transaction en titres.

La plupart de ces transactions furent réalisées avant la fin de 1964. Une liste des titres actuellement détenus par l'IUPAC est donnée à l'Annexe A.

6° RESPONSABILITÉ FINANCIÈRE

Alors que l'IUPAC était peu importante, et que les membres devaient payer eux-mêmes leur voyage s'ils voulaient assister aux réunions, les transactions financières de l'IUPAC étaient simples et pouvaient être menées avec succès presque sans formalités. Ceci n'est plus possible pour une grande organisation avec un roulement de fonds de plus de $100000 par an. Le Trésorier propose donc l'adoption de règles plutôt strictes quant aux engagements financiers et au contrôle du budget.

Dans le passé, les responsables des Divisions et Présidents de Commissions se sont parfois engagés financièrement au nom de l'IUPAC (ou ont fait des promesses encourageantes équivalant à des engagements) alors qu'ils n'avaient pas l'autorité pour ce faire. De tels engagements ont été respectés par l'IUPAC, bien que cela ait parfois posé des problèmes. A l'avenir, aucun engagement ne sera honoré par l'IUPAC, sauf s'il a été prévu dans le budget ou résulte d'une décision du Comité Exécutif.

Le secrétaire de chaque Division sera prié de tenir à jour une petite comptablilité lui permettant de rendre compte des dépenses exactes et de savoir quand elles atteindront la somme fixée par le budget. S'il s'avère que les sommes allouées pour une catégorie de dépenses d'un budget divisionnaire devraient être imputées à une autre catégorie, il y aura lieu de consulter le Trésorier à ce sujet.

Les dépenses doivent bien sûr être réduites au maximum, sans que cela nuise à l'efficacité. Les Comités ne devront pas se réunir si les questions à résoudre peuvent être réglées par correspondance. Les personnes pouvant prétendre au remboursement de frais de voyage devront effectuer leur voyage en classe économique par la voie la plus directe. S'il est possible de réaliser une économie en prenant un billet circulaire, il est évidemment nécessaire de le faire.

Il est souhaitable que les Comités choisissent le lieu de leurs réunions en fonction des frais de voyage les plus bas au total. Les Présidents de Comités devront s'efforcer de prévoir des salles de réunions sans que cela entraîne des frais, ce qui peut être facilement réalisé en utilisant les salles appartenant à une Société chimique ou à une Université.

Avant de terminer ce rapport, le Trésorier désire exprimer ses sincères remerciements à MM. G. HANSELMANN, H. BAUMANN et au Dr J. RAKOWSKI, de l'Union de Banques Suisses, pour l'aide inestimable qu'ils ont apportée à lui-même, ainsi qu'à l'IUPAC.

JOHN C. BAILAR, jr
Trésorier

AUDITORS' REPORT ON ACCOUNTS

Years ended 31 December, 1963 and 1964

Zürich, 17 February, 1965
Löwenstrasse 56

To the Executive Committee
International Union of Pure and Applied Chemistry
Basle—Switzerland

We have examined the balance sheets of International Union of Pure and Applied Chemistry as at 31 December, 1963 and 1964, and the related statements of profit and loss for the two years then ended. Our examination was made in accordance with generally accepted auditing standards and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the enclosed balance sheets and the statements of profit and loss together with the return of supplementary information present fairly the financial position of the International Union of Pure and Applied Chemistry at 31 December, 1963 and 1964, and the results of its operations for the two years then ended, in conformity with generally accepted accounting principles.

Neutra Treuhand AG

Accountants and Auditors

(Lauber) (ppa. *Krieg)*

COMPARATIVE BALANCE SHEETS AS AT 31 DECEMBER, 1963 and 1964

(Expressed in US-Dollars)

Assets

		1963	1964
Cash in Banks		18 471.16	15 930.78
Bankers Acceptances (Commercial Bills)		89 466.26	53 329.56
Bullion Account		14 176.45	14 176.45
Marketable Securities—at cost (Schedule A) (Market Value $112 806.—)		50 918.07	86 093.90
Accounts Receivable		175.66	—.—
Other Assets		844.50	449.65
	US-$	174 052.10	169 980.34

Note: Subscriptions outstanding as at 31 December, 1964 aggregate . . US-$ 4 500.—

COMPARATIVE STATEMENT OF INCOME AND EXPENDITURES, YEARS ENDED 31 DECEMBER, 1963 AND 1964

(Expressed in US-Dollars)

Income

		1963		1964
Subscriptions				
Current Year	58 136.57		63 973.44	
Previous years	1 703.60		7 603.05	
Voluntary contributions	20 000.—[1]		16 770.—[2]	
		79 840.17		88 346.49
Interest and Dividends earned	5 881.20		5 699.53	
Less: Transfer to Reserve a/c	5 881.20		5 699.53	
		—.—		—.—
Sales of Publications		1 925.28		528.46
Royalties from Butterworth		6 813.56		6 935.01
Capital gain on securities sold	—.—		13 907.22	
Less: Transfer to Reserve a/c	—.—		13 907.22	
		—.—		—.—
Operating Loss for period		8 331.03		6 907.47
		96 910.04		102 717.43
UNESCO GRANTS ACCOUNT Subventions collected during year		16 332.24		16 401.41
		US-$ 113 242.28		US-$ 119 118.84

[1] Donation in 1963 from USA

[2] Donations in 1964 — $ 8370.— (£ 3000/—) UK, $ 5000.— Germany, $ 2400.— Sweden, $ 1000.— Denmark

Exhibit I

Liabilities and net worth

	1963		1964	
Accounts Payable		10.30		—.—
Accrued Liabilities		40 157.88		23 397.14
Net Worth:				
Capital Account	102 139.36		102 139.36	
Reserve	40 075.59		51 351.31	
	142 214.95		153 490.67	
Operating **loss** for the twelve months ended 31 December	**8 331.03**		**6 907.47**	
		133 883 92		146 583.20
		US-$ 174 052.10		US-$ 169 980.34

Exhibit II

Expenditure

	1963		1964	
Office Expenses				
Printing, Stationery and Miscellaneous	20 171.54		34 069.38	
Travel and Subsistence Allowances	12 985.88		57 597.93	
General Special Account—London Meeting	72 846.85			—.—
Contribution to Symposia	—.—		15 324.82	
Publications	4 857.65		8 271.81	
Total (Schedule B)	110 861.92		115 263.94	
Less: Subventions collected from UNESCO (Grants)	16 332.24		16 401.41	
		94 529.68		98 862.53
Other Expenses				
Bank Charges	218.77		647.38	
Subscription to ICSU	1 428.20		1 280.62	
Taxes	—.—		904.90	
Audit and Accounting charges	347.62		765.66	
		1 994.59		3 598.56
Exchange Differences (net)		385.77		256.34
		96 910.04		102 717.43
UNESCO GRANTS ACCOUNT				
Expenditures out of grants during year	18 051.80		25 998.04	
Less: IUPAC Funds, UNESCO a/c **overdraft**	**1 719.56**		**9 596.63**	
		16 332.24		16 401.41
		US-$ 113 242.28		US-$ 119 118.84

STATEMENT OF MARKETABLE SECURITIES OWNED AS AT 31 DECEMBER, 1964

Name of Investment	*Interest rate p.a.*	*N U*
Held by Union Bank of Switzerland, Zurich		
Shs Elektro-Watt AG		1
Shs Motor-Columbus		1
Units EURIT		10
Shs Royal Dutch Petroleum Company, ord. Stock of Fls. 20.— 400 / Shs Royal Dutch Petroleum Company, ord. Stock, admin. certs. of Fls. 20.— 8		40
Shs Unilever N.V. certs.		43
Shs International Nickel Co. of Canada Ltd. n.v., Swiss certs.		5
Shs Woolworth FW. Co., Swiss certs.		10
Shs DM Farbwerke Hoechst AG		5
Shs DM Dresdner Bank AG		5
Shs DM Siemens & Halske AG		5
Shs Fls Algemene Kunstzijde Unie		5
Held by Morgan Guaranty Trust Company, New York		
Shs American Electric Power Co., comm. stock		17
Shs E.I. Du Pont de Nemours & Co., comm. stock		1
Shs Johns Manville Corporation, comm. stock		5
Held by Union Européenne Industrielle et Financière, Paris		
Shs Pechiney SA		15
Shs Rhône—Poulenc SA		10
Shs Compagnie de Saint-Gobain		2
Held by Banca Nazionale del Lavoro, Milano		
Shs Società Edison S.p.A.		31
Held by Nomura Securities Co. Ltd., Tokyo		
Shs Sony Corp. registered		3 00

lue	per Unit	Market Value as at 31 December, 1964 Total	in US-$	Book Value (at original cost) in US-$
00.—	sFr. 1 800.—	sFr. 18 000 —	4 174.—	5 439.51
00.—	sFr. 1 380.—	sFr. 13 800.—	3 200.—	4 503.76
—.—	sFr. 146.—	sFr. 15 330.—	3 555.—	4 965.45
20.—	sFr. 189.50	sFr. 77 316.—	17 928.—	9 268.54
20.—	sFr. 170.—	sFr. 73 950.—	17 147.—	1 985.37
—.—	sFr. 361.—	sFr. 18 050.—	4 185.—	4 194.50
3⅓	sFr. 119.—	sFr. 11 900.—	2 759.—	2 780.08
100.—	sFr. 576.—	sFr. 28 800.—	6 678.—	6 693.73
100.—	DM 512.—	DM 25 600.—	6 440.—	6 503.24
100.—	sFr. 606.—	sFr. 30 300.—	7 026.—	7 063.10
100.—	Fls. 494.—	Fls. 24 700.—	6 863.—	6 960.72
6.50	$ 44⅛	$ 7 810⅛	7 810.—	1 402.46
5.—	$ 238⅞	$ 3 583⅛	3 583.—	1 462.49
5.—	$ 54⅝	$ 3 004⅜	3 009.—	1 642.75
50.—	FF 208.—	FF 31 200.—	6 367.—	6 784.71
60.—	FF 349.—	FF 34 900.—	7 122.—	7 466.33
75.—	FF 260.—	FF 5 200.—	1 061.—	1 768.92
000.—	sFr. 14.20	sFr. 4 430.40	1 027.—	2 283.—
50.—	Yen 342.—	Yen 1 026 000.—	2 872.—	2 925.24
			$ 112 806.—	$ 86 093.90

REPORT OF FINANCE COMMITTEE

Establishment of Finance Committee

At the XXIInd Conference, on recommendation of the *ad hoc* Finance Committee, the Council approved establishment of a permanent Finance Committee; accordingly President Lord Todd appointed such a committee, which has been active both by correspondence and through meetings.

Responsibilities of Finance Committee

The functions of the permanent Finance Committee were defined as follows:

It shall be the duty of the Finance Committee to advise the President and the Executive Committee on financial matters. The Committee shall not have executive functions. Decisions with respect to the Committee's recommendations shall be made by the President and/or the Executive Committee.

The Finance Committee shall give detailed advice on purchases and sales of securities. The Committee shall review the IUPAC portfolio semiannually, and recommend any changes that appear appropriate.

Activities of Finance Committee

The Committee has made numerous recommendations to the Executive Committee, most of which were adopted and are, therefore, reflected in the reports of the President and the Treasurer. Consequently, they will not be repeated at length here. A few of the more important items were:

(1) IUPAC funds that were invested in the United Kingdom have been removed to Switzerland and reinvested, thereby realizing an annual saving in taxes of several thousand dollars.

(2) It was proposed that the headquarters of IUPAC be transferred to Switzerland in 1967, as it appears that there is a more favorable tax situation for the Union in Switzerland.

(3) Restrictions on the types of securities in which the Union's funds may be invested have been substantially diminished, thereby permitting the purchase of certain securities that may be expected to yield a greater return.

(4) Securities held in the Union's portfolio were reviewed; some sales were made, and the funds reinvested in more diversified securities.

(5) A recommendation was made that, as far as possible, no invitation for a Conference be accepted in the future unless the host country agrees to finance the Conference.

(6) Provision has been made for pension and insurance benefits for direct employees of the Union.

(7) A proposal was offered that a possible method to increase the income of the Union would be to create a special type of category by which large companies could become "Associates of IUPAC". The Bureau is studying the plan.

(8) The budget was reviewed in detail. Most changes recommended by the Finance Committee were accepted.

(9) The budget now reflects contributions in the form of services and facilities thereby showing more nearly the true cost of the Union's operations.

The Finance Committee

P.M. Arnold, Chairman
Sir Charles Dodds
Dr. C.O. Gabrielson
Prof. Dr. O. Horn
Dr. Rudolf Morf

COMMITTEE ON THE TEACHING OF CHEMISTRY

Report

presented by Professor R.S. Nyholm *on the activities of the Committee at the Council Meeting of IUPAC held in Paris on 8 July 1965*

Mr. President and Members of the Council, this is the first occasion upon which a verbal report has been presented to the Council on the activities of the Committee on the Teaching of Chemistry. I welcome the opportunity of informing you briefly of our progress and our problems and answering any questions which you may wish to raise.

It will be recalled that, as outlined in Information Bulletin 22 of December 1964, our general aims may be summarized under two main headings: (1) to collect and disseminate information concerning chemical education at all levels throughout the world; (2) to offer advice, through public statements and by direct contact with interested bodies, on the kind of activities which it feels will ensure the development of a modern approach to the teaching of chemistry. Needless to say, this very general kind of statement needs amplification in detail, as discussed below.

In order to achieve these objectives, we are very conscious of the need for world-wide contacts and towards this end have left vacant three positions on our Committee. It is intended to invite to our meeting representatives from as many different countries as possible to assist us with our deliberations. Secondly, we are keen to obtain information from all member countries and towards that end have asked for information from member countries and will continue to do so in the future. With regard to our third objective, namely to send out information on chemical education to the various member organizations, the *first* task is obviously to collect data before one can disseminate an overall picture of what is happening throughout the world.

At an early stage in our deliberations we tried to outline the major tasks which we should tackle. It was agreed that we should concern ourselves with chemistry (i) as a part of the general education of all pupils in schools; (ii) as a pre-vocation subject, especially in the last two years at schools; (iii) as an ancillary subject at the University level (e.g. in medical education); (iv) as part of the training of technicians for chemistry; (v) finally chemistry as a professional study at the University (tertiary) level.

This had led to the defining of several areas of study, upon which reports will be prepared and disseminated to member countries. The following list is by no means complete but indicates some of the fields which we consider call for urgent attention.

(1) The in-service retraining of teachers in secondary schools.

(2) The effect of examinations in determining chemistry curricula in high schools.

(3) Trends of development in teaching of chemistry as a unified subject at all levels, i.e. the interweaving of physical, organic, and inorganic chemistry.

(4) The overlap of the teaching of chemistry with physics and with mathematics, and indeed the whole topic of the amount of these two ancillary subjects which should be included in the teaching of a chemist.

(5) The selection of students for higher education in science and technology.

(6) The role and training of technicians.

Taking the first of these topics, we are gravely concerned over the need to ensure that teachers in schools are given an effective opportunity of being brought up to date so that the new courses in chemistry which are being developed can be taught effectively in schools. In certain countries, notably the United Kingdom, alarm has been expressed at the steady decline in the percentage of students studying chemistry in the last two or three years at school; indeed, in England in 1964 the *absolute* number of students who took the General Certificate of Education (Advanced level) in chemistry *decreased* for the first time, the *percentage* having already steadily fallen over the past ten years. (It is of interest to note that this decrease has been paralleled by a similar increase in subjects like economics and geography.) We believe that one of the main reasons why this has been taking place is the steady decline in the supply of good High School teachers and the fact that those who are already teaching in Schools need to be brought up to date and to be helped to adopt a different, less didactic, attitude towards their material. Modern chemistry needs to be taught as an exploratory and investigatory subject instead of one where (alleged) verification of enunciated dictums is carried out.

We recognize the importance of one-day courses and one-week courses for the retraining of teachers, but our thinking at the moment suggests that the ideal is for all teachers to be brought back to a University environment for one term every five to seven years. We have already emphasized our belief that chemistry should be taught as an integrated subject in which the basic principles of physical chemistry are fully woven into the teaching of inorganic and organic chemistry from the outset. It is abundantly clear that many teachers trained in the past were not used to the concept of learning, let alone teaching, inorganic and organic chemistry in such a way that topics such as structure, energetics (thermodynamics) and kinetics were woven into the subject at all stages.

In order to obtain information on the above we have invited Prof. PAUL O'CONNOR of the University of Minnesota in Minneapolis to present us a report comparing and contrasting what is happening in various countries on the subject of "In-service Retraining of Teachers of Chemistry". When this report is received it will be discussed in detail by the Committee and a statement sent out to all members of IUPAC.

The second topic which we have decided to investigate immediately is No. 2 above, namely the effect of examinations in determining the chemistry curriculum in high schools. Towards this end we have invited Mr. J. MATTHEWS who is responsible for examination setting for the Nuffield Project in the United Kingdom to prepare a preliminary report for us. After this has been discussed, we hope to be able to send out a Committee report on this subject also.

It is well known that there have been several attempts to provide new and up-to-date methods for the study of chemistry in schools; these include the so-called CHEM Study projects of USA (Prof. CAMPBELL, a member of the Committee), the chemical bond approach (CBA) of USA (Prof. L. E. STRONG), the Nuffield Project of the United Kingdom (Mr. F. HALLIWELL and his colleagues), and several others in Australia, Japan, and other countries throughout the world. We propose as an early objective of the Committee to try to produce a document which summarizes what these various approaches have set out to do, and insofar as it is possible to assess results so far, indicate the direction in which these experiments are moving.

Finally, I should like to mention that we have effected a close collaboration with the folk in UNESCO. This organization has helped to bring members to meetings and save some cost by ensuring that certain of their functions for which committee members are required will overlap with

our meetings. Secondly, we are collaborating by advising them on the staff who are able to provide the kind of courses which UNESCO wants in various countries throughout the world. Thirdly, we have suggested to them the staff suitable for the production of an annual book on advances in chemistry, a project which will bring together selected articles, suitably edited where necessary, concerning progress in chemical education during the preceding year. Dr. Cartmell of the University of Southampton has been suggested for, has been offered and has accepted, the Editorship of the "Yearbook of Chemical Teaching" which will be produced in due course by UNESCO.

It is also expected that UNESCO will be able to provide, in 1966, approximately $3000 per annum to enable us to carry on our work.

All members are cordially invited to get in touch with the Secretary, Dr. Peter Sykes of Cambridge, or myself at University College, London if there are any queries or suggestions which you would like to put before us.

COMITÉ SUR L'ENSEIGNEMENT DE LA CHIMIE

Rapport

présenté par le Prof. R. S. Nyholm *sur les activités du Comité lors de la réunion du Conseil de l'IUPAC à Paris le 8 juillet 1965*

Monsieur le Président, Messieurs, c'est la première fois qu'un rapport verbal est présenté au Conseil sur les activités du Comité sur l'Enseignement de la Chimie. Je suis heureux de l'opportunité qui m'est donnée de vous informer brièvement de nos progrès et de nos problèmes et je me ferai un plaisir de répondre aux questions que vous souhaiteriez me poser.

Ainsi qu'il l'a été indiqué dans le Bulletin nº 22 de décembre 1964, nos larges buts peuvent être résumés en deux rubriques principales: 1º Rassembler et diffuser à travers le monde des informations concernant l'enseignement de la chimie à tous les niveaux; 2º offrir notre aide au moyen d'exposés publics et par le contact avec les organismes intéressés sur le genre d'activité que nous estimons souhaitable pour le développement de méthodes modernes pour l'enseignement de la chimie. Nul n'est besoin de dire que cet énoncé très général a besoin d'être détaillé, ce que je ferai plus loin.

Afin d'atteindre ces objectifs, nous n'ignorons pas que nous avons besoin de contacts à travers le monde et c'est pourquoi nous avons laissé trois positions vacantes au sein de notre Comité. Nous avons l'intention de convier à nos réunions des représentants du plus grand nombre de pays, ce qui facilitera notre tâche. De plus, nous sommes vivement désireux d'obtenir des informations de tous les pays membres que nous avons d'ores et déjà sollicités dans ce sens et que nous solliciterons dans le futur. En ce qui concerne notre troisième objectif, c'est-à-dire la diffusion d'informations sur l'enseignement de la chimie aux diverses organisations adhérentes, la première tâche consiste évidemment à recueillir des données avant qu'il ne soit diffusé une image générale de ce qui se passe à travers le monde.

Lorsque nous avons entrepris notre tâche, nous avons essayé de définir les points essentiels auxquels nous devrions nous attaquer, et nous avons décidé de nous occuper de la chimie (i) comme partie de l'enseignement général pour tous les élèves, (ii) comme sujet de pré-vocation, surtout au cours des deux dernières années de l'enseignement secondaire, (iii) comme sujet accessoire au niveau universitaire (par exemple pour les étudiants en médecine), (iv) comme partie de la formation des techniciens en chimie, (v) enfin, comme étude professionnelle au niveau universitaire.

Ceci a conduit à la définition de plusieurs champs d'action pour lesquels des rapports seront préparés et diffusés aux pays-membres. La liste ci-dessous est loin d'être complète, mais elle donne un aperçu des domaines que nous considérons comme devant être explorés d'urgence:

1º Former à nouveau les professeurs qui pratiquent l'enseignement dans les écoles secondaires;
2º effet des examens pour fixer les programmes d'études de chimie dans les grandes écoles;
3º tendances du développement de l'enseignement de la chimie comme sujet global à tous les niveaux, c'est-à-dire entrelacement de la chimie physique, organique et minérale;
4º imbrication de l'enseignement de la chimie avec la physique et les mathématiques, ces deux sujets accessoires devant être inclus dans le programme de formation d'un chimiste;
5º faire un choix parmi les étudiants pour un enseignement plus poussé en sciences et technologie;
6º rôle et formation des techniciens.

Pour le premier de ces points, nous sommes préoccupés par la nécessité d'assurer aux professeurs une opportunité réelle de se mettre au courant des dernières nouveautés afin que les nouveaux cours de chimie puissent être effectivement donnés dans les écoles. Dans certains pays, et notamment au Royaume-Uni, l'alarme a été tirée au sujet du déclin continu du pourcentage des étudiants optant pour la chimie au cours des deux ou trois dernières années de l'enseignement secondaire. En Angleterre, au cours de l'année 1964, le nombre absolu d'étudiants ayant passé le General Certificate of Education (Advanced level) en chimie a baissé pour la première fois, le pourcentage ayant déjà régulièrement baissé depuis dix ans. (Il est intéressant de noter que cette baisse a été parallèlement marquée par un accroissement similaire des sujets tels que l'économie et la géographie.) Nous pensons que l'une des principales raisons de cet état de choses est le manque de nouveaux professeurs dans les grandes écoles et le fait que ceux qui enseignent déjà ont besoin d'une formation nouvelle et doivent être encouragés à adopter une attitude différente, moins didactique, envers le sujet qu'ils enseignent. La chimie moderne doit être enseignée comme un sujet d'exploration et d'investigations plutôt que comme un sujet permettant la vérification (prétendue) des lois de la nature.

Nous reconnaissons l'importance des cours d'un jour et d'une semaine pour la formation nouvelle des professeurs, mais nous estimons à l'heure actuelle que l'idéal serait que tous les professeurs retournent à l'université pour un trimestre tous les cinq à sept ans. Nous avons déjà souligné notre conviction que la chimie devrait être enseignée comme un sujet global dans lequel les principes de base de la chimie physique sont entièrement entrelacés avec l'enseignement de la chimie minérale et organique et ce dès le départ. Il est suffisamment clair que nombreux des professeurs formés dans le passé n'étaient pas habitués à la conception d'apprendre la chimie minérale et organique d'une telle manière que les sujets tels que la structure, l'énergétique (thermodynamique) et la cinétique se mêlaient au sujet principal à tous les niveaux, et de ce fait ils ne peuvent pratiquer ce genre d'enseignement.

Afin d'obtenir des informations sur ce qui précède, nous avons invité le Prof. Paul O'Connor de l'Université du Minnesota à Minneapolis à nous présenter un rapport comparant et mettant en contraste ce qui se passe dans différents pays au sujet de la formation nouvelle des professeurs enseignant la chimie. Dès que ce rapport nous parviendra nous l'examinerons attentivement et nous ferons à notre tour un rapport vers la fin de l'année. qui devrait être diffusé à tous les membres de l'IUPAC.

Le second point qui a retenu notre attention immédiate est celui cité en 2° ci-dessus et concerne l'effet des examens pour fixer les programmes d'études de chimie dans les grandes écoles. Pour cela nous avons invité M.J. Matthews, responsable des sujets d'examens du projet Nuffield au Royaume Uni, à nous adresser un rapport préliminaire. Dès que nous en aurons discuté, nous espérons être en mesure de communiquer des résultats vers la fin de l'année.

Nul n'ignore que plusieurs tentatives ont été faites pour trouver des méthodes nouvelles et modernes pour enseigner la chimie; il s'agit notamment du projet d'études CHEM aux Etats-Unis (Prof. Campbell, membre de notre Comité) de la Chemical Bond Approach (CBA) également aux Etats-Unis (Prof. L.E. Strong), du projet Nuffield au Royaume-Uni (M.F. Halliwell et ses collègues), et de plusieurs autres en Australie, au Japon et ailleurs. Notre Comité s'est fixé comme but immédiat la publication d'un document qui résume ces différents projets et qui fasse le point de la situation et indique dans quel sens elle évolue.

Finalement, je souhaite faire mention de la coopération étroite que nous avons eue avec les gens de l'UNESCO; cette Organisation a permis, en amenant des participants à nos réunions, quelques économies et s'est efforcée de faire coïncider certaines de ses propres réunions avec les nôtres. Nous collaborons également sur le plan du personnel, et nous les aidons à trouver pour leurs cours des personnes capables d'enseigner dans différents pays, selon les désirs de l'UNESCO. Nous les avons aussi conseillés sur le choix du personnel recommandé pour la publication d'une revue annuelle sur les progrès de la chimie, projet qui réunirait des articles sélectionnés, soigneusement édité si besoin est, concernant le progrès de l'enseignement de la chimie depuis l'année précédente. Le Dr Cartmell de l'Université de Southampton a été proposé pour accomplir ce travail, l'UNESCO a retenu sa candidature et le Dr Cartmell a accepté de diriger la publication du Yearbook of Chemical Teaching.

On espère aussi que l'UNESCO pourra mettre à notre disposition une somme d'environ $3000 par an, pour nous aider à poursuivre notre tâche, et ce dès 1966.

Tous les membres sont cordialement invités à se mettre en rapport avec le Secrétaire de notre Comité, le Dr Peter Sykes de Cambridge ou avec moi-même à l'Université College de Londres, pour nous poser des questions ou nous faire des suggestions.

EDITORIAL ADVISORY BOARD

Minutes of a Meeting, Paris, 5 July, 1965

Conservatoire des Arts et Métiers, Paris

Present: J.C. BAILAR (Hon. Treasurer of IUPAC), E.J. CRANE, W. KLEMM, E. KLEVER, V.N. KONDRATIEV, L. MARION, R. MORF (Secretary General to IUPAC), W.A. NOYES, A.L.G. REES, H.W. THOMPSON (Chairman), Lord TODD (President of IUPAC), P.E. VERKADE, and B.C.L. WEEDON (Scientific Editor). Mr. C. SAVAGE also attended.

(1) *Chairman's Report*

The Chairman stated that nine complete volumes of "Pure and Applied Chemistry" had now been published, in addition to a number of special supplements, and that the first part of volume 10 had also been issued. He drew attention to the steady increase over the last two years in the number of regular subscribers to the journal. The total was now approaching 900, of whom about one third were in the USA. In addition, there had been substantial sales of the special reprints and other publications. Of a total of 45 such separate issues, one had sold nearly 3000 copies, several had sold more then 2000, about a third more than 1000, and of the remaining issues most had sold 500 to 1000 copies. IUPAC was now receiving steadily a substantial sum in royalties.

The Chairman paid tribute to the work of the Scientific Editor and the Union's publishers (Messrs. Butterworths Scientific Publications) in handling a variety of problems connected with IUPAC publications.

(2) *Scientific Editor's Report*

The Scientific Editor stated that the two annual volumes (8 and 9) for 1964 had been produced according to plan. These had included a long report by the Commission on Analytical Reactions and Reagents, and the plenary lectures delivered at six symposia. It was cause for considerable satisfaction that the interval between holding these symposia and the publication of the proceedings in "Pure and Applied Chemistry" had ranged from as little as 4 months to a maximum of 10 months, the average being about 6–7 months. The delay between the delivery of manuscripts and the publication had, of course, been considerably less in all cases. This achievement had only been possible due to the whole hearted collaboration of organizers and publishers alike.

The Scientific Editor then referred to the far less satisfactory state of affairs with regard to the publication programme for 1965. Plans to publish the Symposium on Chemical Effects Associated with Nuclear Reactions and Radiochemical Transformations (jointly sponsored with IAEA) had had to be abandoned; half the manuscript for "Experimental Thermodynamics", which were expected last year, had still not arrived; modifications requested a year ago for a report on "Recommended Methods for the Analysis of Drying Oils" had not yet been received; no English translation was yet available of the German report by Dr. O. LEUCHS on "Classification of High Polymers". For reasons such as these there had been no publishable material available for several months and the publications programme for the first half of 1965 had been seriously disorganized. A large number of manuscripts were expected in the early autumn from the Congress and Plasma Symposium in Moscow, and from the Symposia on Molecular Spectro-

scopy (Copenhagen), Microchemical Techniques (Pennsylvania), and Macromolecular Chemistry (Prague). However, the Editor warned that it would be a physical impossibility to complete the two annual volumes for 1965 before the end of the calendar year. The Editor was hopeful that a normal situation could be restored by the end of 1966.

(3) *Future publications*

The Board noted the plans already agreed for future publications, and decided that the Plastics Section of the Applied Chemistry Division be asked to furnish an English translation of Dr. LEUCHS' report for publication simultaneously with the German version. The Board asked the Chairman and Editor to discuss with the Union's publishers the possibility of reprinting Sections A and B of the definitive rules for Nomenclature of Organic Chemistry when Section C was issued. It was decided that the corresponding inorganic rules should not be reprinted as they would probably undergo extensive modification in the next two years.

The Chairman and Editor were authorized to make suitable arrangements for publishing the main lectures at the following meetings, subject, where appropriate, to the meeting being given IUPAC sponsorship:

- International Symposium on Organosilicon Chemistry (Prague, September 1965)
- International Symposium on NMR (Tokyo, August–September 1965)
- Symposium on Application of Physico-Chemical Methods in Chemical Analysis (Budapest, April, 1966)
- International Symposium on Free Radicals in Solution (Michigan, August 1966)
- International Symposium on Macromolecular Chemistry (Tokyo, September–October 1966)
- 6th International Symposium on Reactivity of Solids (Schenectady, August 1968)
- 11th International Conference on Co-ordination Chemistry (Haifa, September 1968)

(4) *Limitation on sale of reprints*

The Chairman reported that some individual authors in IUPAC publications had been placing very large orders for reprints of their own contributions. The Board thought that this practice might be prejudicial to sales of the Union's special publications. For this reason, the Board felt that charges to authors for reprints of their own contributions should rise sharply after the first 100 copies.

(5) *Publication of definitive rules for nomenclature, etc.*

The Editor raised this issue since he was expecting to receive for the first time rules jointly sponsored by two Unions (IUPAC and IUB). Clearly the procedure adopted in the past when IUPAC alone was concerned would not be entirely applicable in such cases. It was the view of the Board that such rules should be printed in "Pure and Applied Chemistry" and that both Unions should be allowed to authorize reprinting of the rules, with suitable acknowledgement, in appropriate journals. However, the other Union in question should be asked to prohibit the sale of off-prints since these could be obtained from the Union's publishers. The question of a division between

the two Unions of the royalties from the sale of these off-prints should be explored.

(6) *Publication rules for symposia*

The Chairman stressed the importance of adhering strictly to the procedures that had been worked out for publication of symposia sponsored by IUPAC. However, recent experience had shown that there are special problems associated with symposia which are co-sponsored by other organizations. Hitherto these problems had been dealt with individually as they arose, but the Chairman and Editor would welcome any guidance that could be given on handling such matters.

(7) *Proposed new journal of thermochemistry and thermodynamics*

An informal approach had been made to the Chairman to ascertain whether IUPAC would be prepared to produce such a journal. The Board felt that this raised fundamental issues of policy, and that the matter should be referred to the Executive Committee.

(8) *Names of co-sponsoring bodies*

Division Presidents had asked that names of co-sponsoring bodies should be printed in their original languages on the title pages of IUPAC publications. The Board decided that this should be done provided that the bodies concerned furnished the publishers with a name that could be set in characters normally used in the Union's publications.

(9) *Membership of Board*

It was decided that the constitution of the Editorial Advisory Board should be reviewed, and that a system of rotating membership should be devised before the next Conference in 1967.

The meeting ended at 15.45 hours.

B. C. L. Weedon,
Scientific Editor

MEETING OF CHAIRMEN OF THE NOMENCLATURE COMMISSIONS OF IUPAC

Minutes of the Meeting held at the Conservatoire des Arts et Métiers, Paris, 7 July at 9.30 a.m.

Present: Prof. K.A. JENSEN, Prof. R. BELCHER, Dr. G. WADDINGTON and Prof. O. HOFFMANN-OSTENHOF.

Prof. VERKADE was unable to attend because of ill-health.

(1) After preliminary discussion it was agreed that co-ordination between the various Nomenclature Commissions was necessary, and that a permanent co-ordinating committee should be formed.

(2) The name of the Committee should be The Inter-Divisional Committee on Nomenclature and Symbols. It should consist of Chairmen of all Nomenclature Commissions.

(3) The Convener be Prof. JENSEN and the Recorder to be Prof. BELCHER.

(4) The aim of the Committee should be to exchange all documents (minutes and draft recommendations), so that nomenclature and symbols in all fields of chemistry can be co-ordinated.

(5) Abbreviations and trivial names used in Chemistry and Biochemistry should be listed and circulated between the Commissions.

(6) Documents already published should be obtained from Dr. MORF.

(7) The Commissions on Macromolecules and Clinical Chemistry should be invited to participate.

(8) Dr. WADDINGTON observed that the recommendations of the Committee would be of value to the International Committee on Numerical Data (ICSU).

(9) The Presidents of Divisions and Dr. MORF to be notified so that the Committee be recognized officially.

(10) The meeting terminated at approximately 11 a.m.

Addenda

(a) With reference to Item 9, Prof. JENSEN has since reported that official recognition was given at the Council Meeting on Tuesday, 6 July, 1965.

(b) Mr. R.W. FENNELL of the Commission of Nomenclature of the Analytical Division has been given the duty of collecting the various trivial names used for analytical reagents.

AGENDA FOR THE XXIIIrd IUPAC CONFERENCE COUNCIL MEETING

Paris, July 1965

(1) Approval of the Minutes of the XXIInd (London) Meeting

(2) Statutes

(3) Announcement of Nominations for new Officers and Bureau Members

(4) Announcement of the time of the Elections

(5) Adhering Organizations:
(a) Consideration of requests for admission to membership of IUPAC from: Cuba, Greece, Mexico, New Zealand, Nigeria and Venezuela
(b) Consideration of requests for change of category from the Adhering Organizations of Denmark, Germany and Sweden

(6) Statutory Report of the President

(7) Biennial Report of the Treasurer

(8) Report of the Finance Committee

(9) Budget for 1966 and Tentative Budget for 1967

(10) Ratification by Council of the decisions taken by the Bureau and the Executive Committee since the XXIInd Conference

(11) Relation with Industry; Report of the IUPAC *ad hoc* Advisory Committee and proposals made by Adhering Organizations

(12) Report of the Committee on Teaching of Chemistry (action required)

(13) Report of the Editorial Advisory Board

(14) Reports of the Division Presidents

(15) Report of the Division Presidents on the results of their meeting

(16) Sponsorship

(17) Elections

(18) Headquarters of IUPAC 1965–1967

(19) Co-operation with United Nations' Agencies and other International Organizations

(20) Date and Place of the XXIVth Conference and the XXIst Congress

(21) Any other business

Minutes of IUPAC Council meetings

6 and 8 July, 1965

Present: The President Lord TODD (in the chair), Members of the Bureau, and Delegates of the National Adhering Organizations (see page 18 ff.).

All actions necessary for the holding of a valid meeting of the Council had been taken. Bureau Members and the National Adhering Organizations had been invited to the Council Meetings by the Secretary General by registered letter (ref. 1729, dated 4 January, 1965). A draft agenda had been enclosed with the letter of invitation and comments on, and further suggestions for, it had been requested. Particular attention was drawn to the items 17 and 2, "Elections" and "Statutes" respectively.

The report of the *ad hoc* Statutes Committee listing the proposed changes in the Statutes was sent to the Bureau Members and the National Adhering Organizations on 11 January, 1965.

On 1 March, 1965 (ref. 1988), a letter was despatched by registered mail to the Bureau Members and the National Adhering Organizations, accompanying which were the definitive agenda for the Council Meeting, the President's Report on the State of the Union, and the Biennial Report of the Honorary Treasurer.

On 3 May, 1965, the Statutes as revised and recommended by the *ad hoc* Statutes Committee were despatched to the Bureau Members, the National Adhering Organizations and the Delegates.

These Minutes have been initially prepared and finally checked by a Drafting Committee consisting of Prof. J.S. ANDERSON (UK) and Prof. G. DUYCKAERTS (Belgium), both of whom were approved by the Council.

Minute 1 *Approval of Minutes*

The minutes of the London Meeting were approved and accepted.

Minute 2 *Statutes*

The President reminded Council that the Statutes as presented to the XXIInd Conference in London and provisionally accepted for a two-year period, were then recognized as being in need of some further amendment. A Committee had therefore been set up under the Chairmanship of Dr. D. C. MARTIN (UK) to reconsider them and to produce a revised set of Statutes and By-laws taking into account the suggestions made at and since the London meeting. The Committee's revised version had been circulated to the National Adhering Organizations and was included in the papers before Council.

Dr. MARTIN, commenting on the revised Statutes and By-laws, reminded Council that it was essential for the Union to accept definite Statutes at this meeting. His Committee had discussed fully all comments and proposals received and the resulting document before the Council was now available for definitive discussion. He urged the Council to accept this revised version of Statutes and By-laws, subject to minor verbal changes to improve the style and clarity in a few places. He stressed the importance of systematic numbering of sections and paragraphs on a decimal basis to facilitate reference.

The French Delegation accepted that the English language version of the Statutes and By-laws should be definitive but requested that a French translation be prepared and issued.

The President brought before Council a proposal of the USSR Delegation relating to voting procedure in By-law 2(b) *viz* "that in voting by delegations, each Adhering Organization should cast one vote only, irrespective of its category of memberhsip in the Union". In discussion it was argued by several delegations that the present system of voting reflects more accurately the level of activity in chemistry and the number of chemists in each member country. On an open vote a majority ruled against changing the voting procedure prescribed in the current and revised Statutes and By-laws.

Resolved:

(1) That the revised version of the Statutes and By-laws dated March 1965 and based on the work of the *ad hoc* Committee be accepted as the Statutes and By-laws of the Union, subject to minor changes of a purely editorial nature.

(2) That the French National Committee undertake a translation of the Statutes and By-laws into the French language.

Minute 3 *Nominations for Election of Officers and new Bureau Members*

The President asked Council to deal at once with the election of the Vice-President since this would determine the number of vacancies to be filled on the Bureau. There had been only one nomination, that of Prof. V.N. KONDRATIEV (USSR) and this nomination had the unanimous support of the Bureau.
The President therefore proposed from the Chair that Prof. KONDRATIEV be elected Vice-President of the Union. This proposal was accepted with acclamation and Prof. KONDRATIEV was declared elected as Vice-President.
As a result of Prof. KONDRATIEV's election to the Vice-Presidency seven vacancies were now due to be filled on the Bureau.
The list of nominations for election to the Bureau previously circulated was confirmed. The names of Dr. ZATTAR (Brazil) Dr. MARION (Canada) and Prof. MALISSA (Austria) were added to the list on the authority of the Bureau.

Minute 4 *Date and time of election*

The election of new Officers and Bureau Members was fixed for Thursday, 8 July, at 11 a.m.

Minute 5 *Adhering Bodies*

(a) On the application of Cuba, Greece, Mexico, New Zealand, Nigeria and Venezuela for membership of the Union.

Resolved: That Mexico and New Zealand be elected to membership in Category C; that Greece, Nigeria and Venezuela be elected to membership in Category D; that Cuba be elected in Category C or D, as its Adhering Body shall propose.

(b) On the application of Denmark, Germany and Sweden for change in membership category.

Resolved: That Council approve the change in category of the following countries:

Denmark	from Category B-2	to Category A-1
Germany	from Category A-2	to Category A-3
Sweden	from Category A-1	to Category A-2

Minute 6 *Statutory Report of the President on the State of the Union*

In introducing his Report *the President* pointed out that it had already been circulated and that members had presumably been able to read it. He therefore asked that it be taken as read and confined himself to making the following additional points regarding problems facing the Union.

(1) The activities of the Union have expanded considerably in recent years and its advice is being increasingly sought by international organizations such as WHO, FAO etc. Increased activity means increased expenditure and the cost of operating the Union has been rising faster than its income. Substantial deficits may therefore have to be faced in the next few years.

(2) Efforts are being made to meet this situation (a) by attempting to get increased subventions from member countries; (b) by seeking added help from the world chemical industry which already gives considerable aid and might give more if IUPAC could increase its contacts and demonstrate further the value of the services it can render, and (c) by seeking to achieve maximum efficiency and economy in the conduct of IUPAC affairs.

(3) The main work of the Union is carried out by its Divisions, Sections and Commissions, the officers and members of which are chemists who give their services voluntarily and are unpaid. Their work cannot be too highly praised, but it is clear that with their other professional duties to perform they cannot operate with real efficiency in the absence of a strong central Secretariat with full time officers. This does not imply criticism of our present Secretary General or his staff, but merely emphasizes that the staff should be increased.

(4) The Union has benefited greatly from the fact that for the past six years a large part of the financial burden of the Secretariat has been borne by the Swiss chemical industry. Grateful as we are for this we cannot expect this situation to continue indefinitely nor is it proper that it should. This is a matter which should be taken up by the Executive Committee, which should consider how the financial and organizational aspects of the Secretariat be put on a sound permanent basis.

(5) A major problem now facing the Union is that of keeping under proper control the external activities with which it is concerned —and in particular the sponsorship of symposia, etc.

Resolved:

(1) That the Report of the President be adopted.

(2) That the Executive Committee be asked to consider the organization of the Secretariat on a permanent basis.

Minute 7 *Biennial Report of the Honorary Treasurer*

The Treasurer whose Report had been distributed in advance drew attention to the following points.

(1) The summary Tables show operating losses in 1963 and 1964, and the cost of holding the 23rd Conference in Paris and the 20th Congress in Moscow will lead to a deficit for 1965 estimated to be not less than $40000.

(2) Deficit budgeting for 1966 and 1967 seems inevitable although increasing income from the Journal and unpredictable income from donations *etc.* will probably reduce the notional deficits given in the Report.

(3) In our present circumstances the statutory provisions for scrutinizing all activities of Divisions which have financial implications before approval is given must be rigorously applied, and all appropriate measures taken to reduce expenditure.

Resolved: That the Report of the Honorary Treasurer be accepted.

Minute 8 *Report of the Finance Committee*

The Report, as circulated to delegates, was debated. Each of the new proposals for improving the Union's financial position: (i) removal of the Union's official headquarters from Paris to Switzerland; (ii) revision of the publications arrangements with Butterworths; (iii) insistence that Conference expenses should be defrayed by the host country; (iv) creation of Company Associates—would create consequences and difficulties that require closer study. The President recommended that Council should empower the Bureau and Executive to consider them, so that firm recommendations needing the statutory approval of the Council could be included in the agenda for the XXIVth Conference in 1967.

Resolved: That Council accept the Report of the Finance Committee and refer it to the Bureau and Executive Committee for detailed consideration.

Minute 9 *Budgets for 1966 and 1967*

The Treasurer stated that at the present time only the very tentative budgets set out in his Biennial Report could be presented. Only when Divisions have furnished full information on their planned activities would it be possible for the Treasurer to frame and circulate final budgets for 1966 and 1967.

Resolved:

(1) That the subventions for the various categories of membership as set out in the Treasurer's Report be accepted for 1966 and 1967.

(2) That Council approve the tentative estimates of income and expenditure.

(3) That the Executive Committee prepare detailed estimates for 1967.

Minute 10 *Ratification by Council of decisions taken by the Bureau since the XXIInd Conference*

Resolved: That Council approve the decisions taken by the Bureau since the XXIInd Conference in London, 1963, as set out from time to time in the Minutes of meetings furnished to National Adhering Bodies.

Minute 11 *Relations with Industry. Report of the IUPAC ad hoc Advisory Committee and Proposals from Adhering Organizations*

The President reported that in order to explore the possibilities of closer relations with industry the Executive Committee had, in 1963, set up a small *ad hoc* Committee of leading industrial chemists from France, Germany, Switzerland and the United Kingdom, under the Chairmanship of Dr. RALPH CONNOR (USA). This Committee had considered how IUPAC could best help industry and in its Report had made a proposal that a Symposium covering specific fields of applied chemistry in which research and development work of the highest calibre had been carried out within industry, should be organized under Union auspices (but supported financially by industry), which would be attended by leading industrial chemists.
Sir RONALD HOLROYD (UK) had agreed to look into the feasibility of this proposal and considered it sound. He would be prepared in association with the British National Committee for Chemistry to endeavour to arrange such a symposium in London in 1967. The Bureau recommended that Council should accept this proposal on the understanding that the proposed Symposium should not clash in date with the Prague Conference, and it considered that the Symposium might set a pattern which could usefully be repeated at intervals in later years.

Resolved: That Council approve the proposal of the *ad hoc* Committee and request the British National Committee for Chemistry to organize a symposium along the lines indicated, to be held in London in 1967.

Minute 12 *Report of the Committee on the Teaching of Chemistry*

The Committee, set up in accordance with Minute 19 of the XXIInd Conference in London, 1963, reported through its Chairman, Prof. NYHOLM (UK). Part of the Committee's proceedings has been published in "Information Bulletin" No. 23 (1965). Five projects are being pursued: (i) trends in the teaching of chemistry as a unified subject; (ii) the in-service retraining of teachers; (iii) the selection of students for higher education; (iv) the effects of examinations on syllabuses and curricula in schools; (v) the *rôle* and training of technicians. Project (ii) is regarded as the most important single problem at the present time. A report on this should shortly be issued. The Committee has good liaison with cognate activities and with UNESCO; UNESCO may provide some financial assistance for the Committee's work.

Resolved: That Council accept the report of the Committee, and express its thanks to the Chairman, Secretary and Members for their work.

Minute 13 *Report of the Editorial Advisory Board*

The Chairman of the Editorial Board (Prof. THOMPSON, UK) reported that 9 volumes of Pure and Applied Chemistry have been issued, with a publication schedule of two volumes per year plus supplementary special publications. Sales of the Journal have improved; with many regular subscriptions and good sales of symposium volumes and separate articles, publications now make a useful contribution to the Union's income.

Resolved: That Council accept the Report of the Editorial Advisory Board and thank Prof. THOMPSON and the Scientific Editor, Prof. WEEDON, for their work on behalf of the Union.

Minute 14 *Reports of Division Presidents*

The Division Presidents severally presented verbal reports on the work carried out by their Divisions since the 1963 meeting of Council.

The President pointed out that this form of presentation of reports was wholly unsatisfactory since it was quite impossible to discuss many of the complex issues at the Council meeting when no previous notice had been given. He also emphasized that as regards future activities and other proposals involving expenditure, approval or rejection could not be agreed until the Treasurer had had the opportunity to examine them. He proposed that in future Division Presidents should submit their reports at least one month in advance of the Council meeting so that they could be circulated to members and so be available for reasoned discussion. Brief verbal reports should be restricted to any important matters arising during the meetings held at the Conference.

Resolved:

(1) That the Reports of all six Divisions be formally accepted with the proviso that items involving financial commitments be first examined by the Executive Committee which would have power to approve or reject.

(2) That in future Division Presidents must submit their Reports in writing at least one month before the date of a Conference so that they can be circulated in advance to members of Council.

Minute 15 *Reports of Division Presidents on the results of the Conference*

The following is a brief resumé of those parts of the Division Reports requiring formal approval by the Council.

Division of Physical Chemistry

(1) It was agreed that the wording of the definition of the *mole* approved by the Bureau of IUPAC (Minute 19 (b) of the 16th IUPAC Bureau Meeting, 23–25 March, 1964) should be modified to read: a mole is an amount of a substance of specified chemical formula containing the same number of formula units (atoms, molecules, ions, electrons quanta or other entities) as there are in 12 grams exactly of the pure nuclide ^{12}C.

(2) The recommendation that IUPAC should urge and encourage chemists to use the numerical values of the fundamental cons-

tants listed in "Pure and Applied Chemistry", vol. 9, 453 (1964), was accepted.

(3) It was agreed that the "Bulletin of Thermodynamics and Thermochemistry" should be placed on a subscription basis under the sponsorship of the Commission of Thermodynamics and Thermochemistry, the editorial work, printing and distribution being centred on the University of Michigan. Subject to the Treasurer's examination, a subvention to offset deficits should be provided for the first two years.

(4) It was agreed that the Commission on Electrochemistry should pursue co-operation with CITCE and that CITCE should furnish proposals for Titular and Associate Members of the Commission.

(5) It was agreed that the Chairmen of the Nomenclature Commissions of the Divisions of Physical Chemistry, Inorganic Chemistry, Organic Chemistry, Biological Chemistry, and Analytical Chemistry should constitute an Inter-Divisional Committee on Nomenclature and Symbols, in order to co-ordinate terminology in all branches of chemistry. The Chairmen of the Macromolecular Chemistry Commission of the Division of Physical Chemistry and of the Clinical Chemistry Commission of the Division of Biological Chemistry should be asked to participate.

(6) It was agreed that the existing Commissions of the Division of Physical Chemistry should be retained for the next four years.

(7) A proposal that the Sub-Commission on Gases of the former Commission on High Temperatures and Refractories of the Division of Inorganic Chemistry should be reconstituted as a Commission on High Temperatures in Gases and on Plasma Chemistry within the Division of Physical Chemistry was not accepted.

Division of Inorganic Chemistry

(1) It was agreed that the Commission on Atomic Weights and the Commission on Nomenclature should be continued for four years.

(2) It was agreed that the Commission on Geochemistry should be dissolved.

(3) It was agreed that the existing Commission on High Temperatures and Refractories with its two Sub-Commissions on Condensed States and on Gases should be dissolved and should be replaced by a small Commission on High Temperatures and Refractories for the next two years.

Division of Organic Chemistry

(1) It was agreed that a Commission on Chemotaxonomy should be set up to collaborate with the IAPT in a Joint International Committee on Chemotaxonomy.

(2) It was agreed that the Commission on Nomenclature should be continued.

(3) The Council received a paper on possible modifications in methods of scientific publication.

Division of Biological Chemistry

(1) It was agreed that the Commission on Biochemical Nomenclature should continue, and it was reported to Council that the scheme for co-operation with the Nomenclature Commission of the International Union of Biochemistry, as announced at the XXII Conference, London 1963, Minute 16, was already being implemented.

(2) The action of the Commission on Clinical Chemistry in undertaking to standardize the units to be employed in reporting the results of clinical chemical analyses was approved.

Division of Analytical Chemistry

(1) It was agreed that the existing Commissions of the Division should be continued and it was noted that the Commissions on Analytical Reactions, on Microtechniques, on Electroanalytical Methods and on Optical Data should be finalising sections of their work for report and publication within the next two years.

(2) It was agreed that a small Commission on Radioactivity should be set up on the basis of the IAEA Report.

Division of Applied Chemistry

(1) It was agreed that the Commissions on Food Additives and on Trace Constituents of the *Section on Food* should be continued for a further two years.

It was agreed that two Commissions be established within the *Section on Pesticides*:

(a) Commission for Development, Improvement and Standardization of Methods of Analysis for Pesticides and Residues.

(b) Commission for studying the Chemical Nature of the Final Residues of Pesticides.

(3) It was agreed that the affiliation of the *Section on Paper Chemistry* with the corresponding Section of the International Commission for Cellulose Analysis should be dissolved.

(4) It was agreed that the Commission for Chemical Analysis of Paper should be continued.

(5) It was reported that the *ad hoc* Committee, set up under Minute 20 of the 22nd Conference, London 1963, to study the relation between the interests of IUPAC and the subject of Chemical Engineering, had found it impossible to establish any formal connections with the International chemical engineering bodies. The Institution of Chemical Engineers of the United Kingdom had viewed with some sympathy the possible establishment of a Division or Commission of Chemical Engineering within IUPAC, but neither the Pan-American Federation of Chemical Engineers nor the European Federation of Chemical Engineering were disposed to collaborate with the Union. Council accepted that no further action was possible at the present time.

In addition to the foregoing, approval was given to the membership of the Executive of each of the foregoing Divisions and to changes in membership of their respective Commissions as reported by the several Division Presidents.

The Reports of the Division Presidents also included announcements of a number of forthcoming symposia to be held under the auspices of the Union. In so far as the sponsorship of these symposia would imply financial support by the Union, Council accepted that the proposals must be subject to the final scrutiny and approval of the Honorary Treasurer and the Executive. The symposia announced by the Division Presidents were:

(a) Symposium on Progress in Chemical Thermodynamics—London or Heidelberg, 1967.

(b) 9th International Conference on Co-ordination Chemistry—St. Moritz, 1966.

(c) 10th International Conference on Co-ordination Chemistry—Japan, 1967.

(d) 11th International Conference on Co-ordination Chemistry—Israel, 1968, subject to the agreement of the organizers to certain formal matters requested by the Union.

(e) 3rd International Conference on Organometallic Chemistry—Munich 1967—subject to a favourable report on the 2nd Conference to be held in Madison, Wisconsin, September 1965.

(f) Symposium on Electrochemical Methods of Analysis—Budapest 1966.

(g) Co-sponsorship with the Société Chimique de France and other relevant societies in the Second European Conference on Plastics and Rubber—Paris 1966.

(h) Symposium on the Dissolution of Pasteboard and Paper—Helsinki 1966.

Minute 16 *Sponsorship*

The Executive Committee proposed that the policy of the Union towards the sponsorship of meetings should be defined by the resolution set out below. This had been approved by the Bureau and would consolidate practises already in operation.

The policies according to which IUPAC shall grant sponsorship to a meeting are as follows:

(1) The only meetings which will qualify for sponsorship are those
(a) for which a provisional application has been made at least two years before the scheduled date of the meeting, and
(b) which have been endorsed by a Division of IUPAC (or possibly Divisions) and recommended by it (them) to the Bureau, and
(c) whose organizers have settled all questions of publication of papers presented at the meeting with the Editorial Board of IUPAC.

(2) IUPAC shall grant a subvention in addition to sponsorship only when such subvention is deemed necessary for the successful conduct of the meeting.

(3) Save in special circumstances, the granting of sponsorship and of a subvention shall be limited to meetings which are to be held in non-Conference years. The total amount set aside for subventions for each such year shall not exceed $12000.

(4) Sponsorship may be granted for a meeting which is to be held in a Conference year if, in the judgement of the Bureau, such meeting will not detract from the Conference or the Congress and if the host organization of the Congress consents.

(5) All decisions relating to sponsorship of a meeting of IUPAC shall be made by the Bureau. When joint sponsorship with another organization(s) is requested, the decision of the Bureau shall be based on the merits of the particular case.

Resolved: That Council accept the resolution as defining the Union's policy on sponsorship.

Minute 17 *Elections*

Nominations for the election had been invited from Adhering Organizations in a letter ref. 1729 dated 4 January, 1965. Nominations received up to 2 May, 1965, together with the nominations made on the authority of the Bureau, had been listed and furnished to delegations, together with short biographical notes on the candidates.
The procedure followed at the election was that laid down in the interim Statutes and By-laws adopted at the XXIInd Conference in London, 1963.

The Officers and Bureau members elected were:

President: Prof. Klemm

Vice-President: Prof. Kondratiev

Members of the Bureau (7 vacancies; all elections to be for a four-year period)
Prof. Deulofeu (Argentina)
Dr. C.O. Gabrielson (Sweden)
Prof. D. Ginsburg (Israel)
Dr. T.R. Govindachari (India)
Prof. L. Marion (Canada)
Prof. O. Wichterle (Czechoslovakia)
Prof. H. Malissa (Austria)

Minute 18 *Headquarters of IUPAC, 1965–1967*

The President stated that at the Montreal meeting in 1961, held under the old statutes, it had been agreed that the Headquarters of IUPAC should remain at Paris for the four years 1961–65. The interim statutes adopted in London in 1963 (which in this respect accord with the revised Statutes accepted by this Conference) permit the location of the Union's headquarters to be changed by decision of Council every fourth year, commencing with 1963. The Finance Committee, in its review, recommended that some saving in taxation might be achieved by having the headquarters of the Union in Switzerland. No definite proposal was laid before Council, however, and both the real financial benefits and the legal and procedural consequences of changing the location of the headquarters would have to be fully examined before any proposal could be made. The Bureau therefore recommends that the situation be left as it is until 1967, when a definite proposal can be laid before the XXIVth Conference.

Resolved:

(1) That no action be taken to move the headquarters of the Union from Paris before 1967.

(2) That the Bureau examine all aspects of changing the location of the headquarters in order to bring a definite recommendation to the XXIVth Conference in 1967.

Minute 19 *Co-operation with United Nations agencies and other international Organizations*

The Bureau has agreed that the Union must do all it can to meet requests from international agencies for advice in such matters as standardization, standard methods of analysis, etc. Presidents of Divisions, at their meeting on 7 July, 1965, considered that this must be essentially a task for Divisions and advised that *ad hoc* working parties should be set up as required by the Divisions concerned. The Division of Applied Chemistry and Division of Analytical Chemistry would be those most frequently involved. Good liaison and rapid access to information could be secured by setting up small inter-Divisional groups.

Resolved: That the procedure advocated by the Presidents of Divisions be adopted.

Minute 20 *Date and place of the XXIVth Conference and XXIst Congress*

The Chairman of the Czechoslovak Chemical Society, in a letter to the Secretary General dated 27 February, 1964, had invited the Union to hold both the XXIVth Conference of IUPAC and the XXIst Congress of Pure and Applied Chemistry in Prague in 1967.

Resolved: That the invitation from Czechoslovakia to hold the XXIVth Conference and XXIst Congress of the Union in Prague in 1967 be accepted with thanks.

Minute 21 *Future activities of the Union*

(a) The Australian Academy of Science invited the Union to hold the XXIInd Congress of the Union in Australia (in Canberra, Melbourne or Sydney as may be determined) in 1969.

(b) The United States National Academy of Sciences and National Research Council, through its Division of Chemistry and Chemical Technology, invited the Union to hold the XXIIIrd Congress of the Union and, if financial arrangements permit, the XXVIth Conference, in the United States in 1971.

The President, with the acclamation of Council, expressed the thanks of the Union to Australia and the United States for these invitations.

IUPAC **Various suggestions regarding subjects for future Congresses**—This is only a draft proposal without any liability (For Information and Comments) as on 30 May 1965

YEAR	CONFERENCES	PHYSICAL CHEMISTRY	INORGANIC CHEMISTRY	ORGANIC CHEMISTRY	BIOLOGICAL CHEMISTRY	ANALYTICAL CHEMISTRY	CHEMICAL TECHNOLOGY	APPLIED CHEMISTRY									COORDINATION CHEMISTRY	SPECTROSCOPY	CATALYSIS	SOLID STATE
								I	II	III	IV	V	VI	VII	VIII	IX				
1951	XVI New York Washington	New York Washington	New York Washington	New York Washington	New York Washington	New York Washington	New York Washington	N.Y. Wash.	N.Y. Wash.	N.Y. Wash.	N.Y. Wash.	N.Y. Wash.	N.Y. Wash.	N.Y. Wash.	N.Y. Wash.	N.Y. Wash.				
1952																				
1953	XVII Stockholm	Stockholm														Wood Symposium Uppsala				
1954			Münster																	
1955	XVIII Zurich	Macromol. Symposium Zurich		Zurich																
1956						Analytical Congress Lisbon														
1957	XIX Paris	Paris	Paris	Paris																
1958																	Symposium London			
1959	XX Munich		Munich		2 Symposia Munich					3 Symposia		Ultrahigh Pressure Removal of Biological and Industrial Waste Food Additives						Bologna		
1960		Macromol. Moscow		Symposium Natural Products Australia	Symposia Edinburgh														Paris	Amsterdam
1961	XXI Montreal	Montreal		Symposium Theoretical Chemistry		Symposium Penna. USA Budapest				Symposia on		Wood Plastics Electrochemistry					Symposium USA			
1962				Natural Products Prague/Florence Brussels													Sweden	Symposium Tokyo		
1963	XXII London	Macromol. Paris-Lund	Symposium High Temperatures USA	London		Partly London				5 Symposia in London								Symposium Budapest		
1964		Photochem. Strasbourg Rhode Island	see Coord. Chemistry	Kyoto Heidelberg			Symposium USA Medical Chemistry ?										Vienna		Amsterdam	Munich
1965	XXIII Paris	Moscow Symp. Prague Vienna	Moscow Symp. Paris	Organo Silicon Prague		Moscow Symp. USA	Moscow											Copenhagen		
1966		Tokyo Kyoto Boston		Stockholm Ann Arbor													St. Moritz			
1967	XXIV Prague			Prague		Prague				Symposia in Latin America							Japan			
1968		Oak Ridge								Symposia in Latin America and Middle East										
1969	?	Australia	Australia							Symposia in Europe and South Africa							Israel		Moscow	Schenectady
1970																				
1971	?	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA				



AGENDA FOR THE 17th BUREAU MEETING

Paris, July 1965

(1) Statutes
(2) Elections
(3) Statutory Report of the President
(4) Report of the Finance Committee
(5) Report of the Treasurer
(6) Relation with Industry: Report of the IUPAC *ad hoc* Advisory Committee
(7) Report of the Committee on Teaching of Chemistry
(8) Sponsorship
(9) IUPAC Headquarters 1965–67
(10) Future Activity
(11) Division Presidents' Report
(12) Minutes of the Executive Committee Meeting (Canberra)

MINUTES OF THE 17th BUREAU MEETING

held in the Conservatoire des Arts et Métiers, 292 rue St-Martin, Paris 3e,
on
Saturday, 3 July 1965; 15.00–18.00 hours
Monday, 5 July 1965; 9.00–12.00, 16.00–18.00 hours

Present

Lord TODD, F.R.S., President
Prof. W.A. NOYES, Jr. Past-President
Prof. W. KLEMM, Vice-President
Dr. R. MORF, Secretary General
Prof. J.C. BAILAR, Jr., Treasurer
Prof. J.H. DE BOER
Prof. V. DEULOFEU
Dr. C.O. GABRIELSON
Prof. D. GINSBURG
Dr. T.R. GOVINDACHARI
Prof. V.N. KONDRATIEV
Prof. J. LECOMTE
Prof. H. MALISSA
Prof. L. MARION
Prof. S. MIZUSHIMA
Dr. A.L.G. REES
Prof. G.M. SCHWAB
Prof. W.M. SPERRY
Prof. H.W. THOMPSON, FRS
Prof. R. TRUHAUT
Prof. P.E. VERKADE
Prof. O. WICHTERLE

Specially invited by the President for part of the Meeting

Mr. P.M. ARNOLD
Dr. W. GALLAY
Prof. B.C.L. WEEDON

Introduction

In his opening remarks, Lord TODD welcomed the Bureau to Paris and then conveyed to Prof. LECOMTE, and through Prof. LECOMTE to the Comité National de la Chimie de France, his and the Union's thanks for the arrangements that had been made and for the hospitality that had been shown. In expressing his appreciation, he recalled the great services of French chemists to IUPAC throughout its history.

The President explained to the meeting that whereas at previous Conferences the Bureau had been able to discuss the Agenda of the Council Meeting for a short time only, on this occasion sufficient time had been allowed for a discussion of most of the items. The more important items were discussed on 3 July and the remainder on 5 July.

The Minutes that follow are similar to those of the 15th Bureau Meeting printed in *Comptes Rendus XXII*, p. 163, in that they are relatively brief. In order to save endless repetition, items will be referred to in detail in the Minutes of the Council Meeting.

Minute 1 *Statutes*

Lord TODD informed the meeting that the Statutes Committee that had been appointed at the 16th Bureau Meeting (Basle, 1964), chaired by Dr. D.C. MARTIN, had prepared the tentative version of the Statutes included in the Council files. The Committee had taken into consideration all the recommended modifications to the Statutes as provisionally accepted by the Council at the XXIInd Conference (London, 1963).

Prof. THOMPSON announced that the British National Committee had some fifty suggestions for linguistic improvements to the text of the tentative Statutes. These were handed over to the members of the Statutes Committee for their consideration

Resolved:

(1) That the Statutes Committee be thanked for its preparation of the new version of the Statutes;

(2) that the Statutes as presented—except for the possible incorporation by the Statutes Committee of some of the linguistic changes suggested by the British National Committee— be recommended to the Council for acceptance.

Minute 2 *Elections*

It was announced that for the six or seven vacancies that would be occuring in the Bureau some fourteen nominations had been received. It was

Resolved: That the names of Profs. H. MALISSA (Vienna) and L. MARION (Canada) and Dr. W. ZATTAR (Brazil) be added to the list of proposed candidates.

Minute 3 *Statutory Report of the President on the State of the Union*

The President's report having been despatched to the Members of the Bureau on 1 March, 1965, was taken as read. Lord TODD thought it necessary, however, to point out that

(1) the current financial commitments of IUPAC could be met only because of the generosity of four chemical firms in Basle;

(2) for the better assistance of the Divisions, Sections, and Commissions of IUPAC and of other international organizations, it was desirable to strengthen the Central Secretariat.
He pointed out that it is essential for IUPAC to formulate a mechanism by means of which the Union may become self-supporting.
It was decided that the matter be put before the Council for discussion, and that the Council be requested to empower the Executive Committee to take any necessary action.

Minute 4 *Biennial Report of the Honorary Treasurer*

The Treasurer's Report having been despatched to the Members of the Bureau on 1 March, 1965, was taken as read. Prof. BAILAR drew the attention of the meeting to the Budgets for 1966 and 1967, both of which showed large deficits; he suggested that the financial situation was not at all healthy and proposed that all efforts should be made to improve it. Measures suggested by the Treasurer included.

(1) the organization of a charter flight from the USA to Europe for the XXIVth Conference (Prague 1967);

(2) the enforcing of some measure of control over the attendance of, and expenses given to, Titular Members;

(3) the enforcing of some control over the expenditure by Divisions, Sections and Commissions, by making it mandatory for a copy of the Minutes of every Meeting and for a copy of all correspondence regarding financial matters to be sent to the Treasurer.
Prof. BAILAR also made the point that the income of IUPAC could be increased if National Adhering Organizations could be induced to adhere in higher categories.

Minute 5 *Report of the Finance Committee*

The report of the Finance Committee (see page 114) was given by Mr. P.M. ARNOLD, the Chairman of the Committee. The following points were recommended by the Committee and discussed by the Bureau:

(1) Headquarters—The Finance Committee recommended "that the Council authorize the Executive Committee to move the official Headquarters to Switzerland at such time as suitable legal arrangements can be made". It was pointed out that according to the Statutes such a move could not be effected before 1967, but it was

Resolved: That the financial savings that would be occasioned by moving the Headquarters of IUPAC from Paris to Switzerland be fully explored.

(2) The Finance Committee proposed that IUPAC should make an agreement with Messrs. Butterworth Ltd., whereby the latter would pay the Editors out of the pre-tax Royalities due to IUPAC. The gross income in Great Britain would be thereby reduced and so correspondingly would be the UK income tax payable by the Union. The Bureau expressed doubts about this proposal since it would make the editors legally employees of Butterworth Ltd. rather than of IUPAC. If this were so the proposal would be unacceptable. It was, however, suggested that the Treasurer might make an enquiry of the publishers as to the legal position regarding any such change and that Prof. THOMPSON should also take the matter up informally to see if anything could be done which did not entail transference of the Editors from Union to Butterworth employment.

(3) Expenses for Conferences—It was proposed by the Finance Committee that "no invitation for a Conference be accepted in the future unless the host country accepts responsibility for financing the Conference".

(4) Company Associates of IUPAC—With a view to increasing the income of IUPAC, the Finance Committee proposed a scheme according to which Companies could enjoy formal association with IUPAC. It was

Resolved: That the proposal of the Finance Committee regarding Company Associates of IUPAC be examined.

The Bureau also

Resolved: That the thanks of IUPAC be expressed to the Finance Committee under the Chairmanship of Mr. P.M. ARNOLD.

Minute 6 *Relations with industry*

Lord TODD summarized the recommendations submitted by the *ad hoc* Committee which had been established under the Chairmanship of Dr. R. CONNOR in order to investigate IUPAC's relations with industry.

Minute 7 *Sponsorship*

A. General policy

The Executive Committee, at its 54th and 55th Meetings in Austin (USA) and Canberra (Australia) respectively, had drawn up a set of regulations regarding IUPAC sponsorship, which were presented to the Bureau (see Council Minute 16).

Resolved: That the regulations regarding sponsorship be approved and presented to the Council.

B. Day-to-day matters

(1) Sponsorship was requested for the Conference on the Application of Physico-Chemical Methods in Chemical Analysis, to be held in Budapest (Hungary), 20–23 April, 1966.

Resolved: That sponsorship be granted to the Conference on the Application of Physico-Chemical Methods in Chemical Analysis, without financial assistance and on the understandings

(a) that the subject matter be limited, and

(b) that the agreement of the organizers of the XXIst IUPAC Congress be obtained.

(2) Sponsorship was requested for the Pesticides Congress to be held in Vienna (Austria), 30 August—5 September, 1967. Permission was requested for the Pesticides Section of the Division on Applied Chemistry to meet during the Pesticides Congress and for the Section Chairman and Secretary alone to attend the XXIVth IUPAC Conference.

Resolved: That sponsorship be granted to the Pesticides Congress in 1967, without financial assistance.

That the organizers of the Pesticides Congress be asked to avoid a clash of dates between their meeting and the XXIVth IUPAC Conference and XXIst Congress.

(3) Sponsorship was requested for the 3rd International Conference on Organo-Metallic Chemistry to be held in Munich in 1967.

Resolved: That sponsorship be granted to the 3rd International Conference on Organo-Metallic Chemistry, provided that a satisfactory report is given by the delegates attending the 2nd Conference later in 1965.

(4) Sponsorship was requested for the 11th International Conference on Coordination Chemistry, to be held in Israel in 1968.

Resolved: That sponsorship be granted to the 11th International Conference on Coordination Chemistry.

(5) Sponsorship was requested for a 9th European Spectroscopy Meeting, to be held in 1967 at a location still to be decided.

Resolved: That sponsorship be given to the 9th European Spectroscopy Meeting, without financial assistance.

(6) *Resolved:* That *no sponsorship* be given to the 1st International Conference on Crystal Growth or to the Symposium on Crystal Chemistry of Inorganic Compounds.

The Bureau was informed by Prof. O. WICHTERLE that the statement that appeared in the Minutes of the Meeting of the Commission on Macromolecules in London in 1963, namely: "An invitation to have a meeting in October 1966 in Japan is presented by Prof. SAKURADA and accepted" (Comptes Rendus XXII, p. 184), had been understood by the organizers of the meeting as signifying that *IUPAC Sponsorship* had been *granted.* However, the request for sponsorship had never been presented to the Council, Bureau or Executive Committee, and therefore had never been discussed or agreed to.
Since the organizers, in good faith, had already announced their meeting as being sponsored by IUPAC and since the Division felt able to recommend sponsorship, it was

Resolved: That sponsorship be granted to the International Symposium on Macromolecular Chemistry (Tokyo, Japan, 28 September—4 October, 1966), without financial assistance.

Minute 8 *Report of the Editorial Board*

Prof. THOMPSON brought the attention of the Bureau to the untiring efforts of Prof. WEEDON, which have contributed so much to the success of the Journal, and referred to the valuable help now being provided by Dr. C.F. CULLIS as Assistant Scientific Editor.
Prof. WEEDON stated that the position of the Journal was, on the whole, very satisfactory. The two annual volumes for 1964 had been produced according to plan. These included the plenary lectures from six Symposia; the interval between holding a Symposium and the publication of the proceedings in the Journal had ranged from 4 to 10 months. The fact that little had so far been published this year was due entirely to lack of suitable material. This situation had arisen from delays in the submission of various manuscripts, and the unexpected cancellation of some publication plans. A large number of manuscripts were expected in the autumn, but it would be impossible to issue two volumes during the current year.
Prof. THOMPSON informed the Bureau that there were now many regular subscriptions to the Journal. In addition there had been substantial sales of the special reprints and other publications. Although the total sale of the various publications varied considerably, it is expected that IUPAC will receive a royalty income of some $10000 in 1966.

Minute 9 *Future Activity*

(1) The National Adhering Organization of South Africa had submitted a proposal for a Symposium to be held in South Africa and Prof. SCHULTE of Münster had proposed that IUPAC should

organize a Symposium on Pharmaceutical Chemistry. In the absence of sufficient detail regarding these proposals the Secretary General was asked to make further enquiries and to report to the next Bureau Meeting.

(2) Prof. GALLAY summarized his report on "Communication among Branches of Pure Chemistry and between Pure and Applied Chemistry" (See page 145). The Chairman asked the Division Presidents to comment on the report at the next Bureau Meeting.

MINUTES OF THE 18th BUREAU MEETING
(New Membership)

held in the premises of the Centre national de la Recherche scientifique, Gif-sur-Yvette, on Thursday, 8 July 1965, 14.30–16.00 hours.

Present: Prof. W. Klemm, President
Lord Todd, FRS, Past-President
Prof. V.N. Kondratiev, Vice-President
Dr. R. Morf, Secretary General
Prof. J.C. Bailar, Jr., Treasurer

Prof. J.H. de Boer
Prof. V. Deulofeu
Dr. C.O. Gabrielson
Prof. D. Ginsburg
Dr. T.R. Govindachari
Prof. J. Lecomte
Prof. H. Malissa
Prof. L. Marion
Prof. S. Mizushima
Dr. A.L.G. Rees
Prof. G.M. Schwab*
Prof. W.M. Sperry
Prof. H.W. Thompson, FRS
Prof. R. Truhaut
Prof. P.E. Verkade
Prof. F. Weygand
Prof. P.W. West
Prof. O. Wichterle

* without vote.

Minute 1 *Election for the Executive Committee*

Prof. J. Lecomte was elected member of the Executive Committee.

COMMUNICATION AMONG BRANCHES OF PURE CHEMISTRY AND BETWEEN PURE AND APPLIED CHEMISTRY

The very great importance of this problem was stressed by Lord TODD in his Presidential Address delivered to the 1963 Congress in London, and the implications of the serious import of this problem are generally recognized. His statement requires no amplification, but perhaps it should be stressed that the problem is particularly serious in the relationship between pure and applied chemistry. The raw material for applied chemistry is the flow of new knowledge from pure chemistry. This is rapidly becoming so voluminous and detailed, and sub-divided into so many separate channels, that it is becoming extraordinarily difficult for the applied chemist to have a proper awareness of his raw material.

This is a world-wide problem and it seems to me that it constitutes a particularly fine example of the potential value of a world-wide body such as IUPAC. In our organization we have a body of men who are not only recognized authorities in their own special fields but who also have the advantage of being well organized for communications with others in their particular branch of chemistry and, above all, who have at their disposal a direct and efficient means of working together with all other branches of chemistry.

I suggest therefore that IUPAC recognize that this is a task of the highest importance, and that it take steps to explore the nature of the problem and possible avenues of attack. I suggest specifically that an *ad-hoc* Committee on inter-disciplinary communications be formed for this purpose.

I would judge that the first approach of such a Committee would be to determine what is required. Some form of systematic review papers is obviously involved. Lord TODD discussed in his statement some of the short-comings of many of the reviews which have been published. His criticisms are well taken, and a vast improvement could undoubtedly be obtained by a systematic sub-division of branches of chemistry for the purpose, and assignments to carefully chosen reviewers. I would think however that the whole philosophy of the purpose of such reviews should be explored. Should they for example be reviews of a narrow field for the benefit of the specialist in that field, which is so frequently the case? Or should they be reviews of a much broader field for the benefit of those who work outside that field? A very good case could be made for the latter for several reasons. The specialized review is already carried out in several ways. As far as the applied chemist is concerned, he wants an opportunity of keeping up in a broader way with the advances in a broad basic field. Perhaps the same could be said of anyone working in a branch of pure chemistry, with respect to other branches of chemistry.

One of our aims has been to enlist the support of industry. Industry is vitally interested in this matter of information. Technological applications could be greatly enhanced by clues and ideas found in the proper type of reviews in various fields.

Perhaps the suggested *ad-hoc* Committee should even at the outset have representation from most of our present Divisions, so that the status and short-comings of the presently available reviews would be correctly interpreted, and needs from various points of view expressed and recognized.

In short, what I visualize is a system of objective reviews in sub-branches of chemistry produced with a frequency depending on the activity in that field. The prime purpose would be to prevent the isolation of chemists in their narrow sphere. A second purpose directly correlated would be to

provide stimulation of ideas from another field, and this would be particularly applicable to applied chemistry and technology. The chief problem as I see it, would be a nicety of judgment as to how broad such reviews should be, in between the narrowly based review for specialists, and something so broad as to present merely a general story which is not annotated.

This is admittedly a long-term endeavour and a major task not to be entered into lightly. An initial exploration of the nature of the problem, assuming that it is found worthy of attack, could delineate the magnitude of the task, with related ideas as to methodology and extent of financing required. It might be found eventually that the support of various agencies, foundations, industrial and research associations, chemical organizations, and the like would be forthcoming for a sound solution to this universally recognized problem.

Dr. W. Gallay
Vice-President, Applied Chemistry Division

I. PHYSICAL CHEMISTRY DIVISION

REPORT OF THE DIVISION PRESIDENT

Meeting of the Division Committee, Wednesday, 7 July, 1965

The Division Committee has not met since the London Conference but the Division has been active in its Commissions. The Division as a whole organized the 5th International Symposium on Reactivity of Solids in August 1964 in Munich with about 350 participants and 70 papers; the 5 invited papers were published in "Pure and Applied Chemistry".

I.1 Commission on Symbols, Terminology and Units

(1) An agreement has been worked out with ISO/TC 12 on Quantities and Units, e.g. activity coefficients. This work will be continued during the Paris Conference.

(2) Prof. Brusset has taken part in the sessions of the SUN-Commission of IUPAP.

(3) The Commission had a meeting in Copenhagen, 7–12 July 1964 on the revision of the Manual. More general principles, new constants and indications of signs have been introduced. The thermodynamic symbols shall preliminarily be kept unchanged because of the existing discrepancies. The definition of the Mole has been accepted. After the Paris Conference a new draft Manual will be submitted to the Division.

I.2 Commission on Thermodynamics and Thermochemistry

(1) Two numbers of the Bulletin have appeared. In the future the Bulletin will be self-supporting and will no longer need support from IUPAC.

(2) The second volume of thermochemistry (Skinner) has appeared and the volume by Vodar on properties of liquids is under preparation.

(3) The Task Group under Newitt on Tables of Technical Gases has already collected the bibliography.

(4) A Task Group on Constants works with Rossini, and other Task Groups on the temperature scale.

(5) A Symposium has been held in Lund, and a joint Symposium with IAEA will be held in Vienna later in July 1965. A Calorimetry Conference is planned for 1967.

I.3 Commission on Electrochemistry

Sub-Commission 1 (Symbols and Terminology) has published a report on nomenclature and definitions. The Chairman of the Sub-Commission took part in the meeting of Commission I in Copenhagen because of the question of electrochemical signs.

Sub-Commission 2 (Thermodynamics) will give its report in Paris.

Sub-Commission 3 (Kinetics): Prof. Tanaka has made an uncritical table of kinetic parameters.

The whole Commission has discussed the relationship CITCE-IUPAC.

I.4 Commission on Macromolecules

See report of the Commission Chairman, p. 155.

I.5 Commission on Data and Standards

A monograph on purity of substances is under preparation. The introduction by the Chairman is already finished.

The definition of the liter has been accepted by the General Conference on Weights and Measures. (Since the London discussions, no work has been done on standard substances.)

I.6 Commission on Molecular Structure and Spectroscopy

Sub-Commissions 2 (Infrared intensity) *and 5* (Storage and Documentation of Data) have together attended a Gordon Conference. It has been decided to continue the term "micron". Absorption calibrations have been discussed. NSDS have made progress in infrared standard spectra.—A multi-language dictionary will be prepared with wave length standards for 600–10 cm^{-1}.

I.7 Commission on Colloid and Surface Chemistry

A report on Symbols and Terminology is available by OVERBEEK and a report on Catalysis by HORIUTI. A report on Adsorption by DUBININ is expected. The reports will be submitted to the Commission Committee in Paris.

I.8 Joint Commission on Applied Radioactivity

See Report of the Commission Chairman I.8, p. 164.

I.9 Triple Commission on Spectroscopy

The *Triple Commission on Spectroscopy* met in September 1964 in Hamburg. Meetings are foreseen in Paris and in Copenhagen in August.

Any other business

(i) La Commission de Nomenclature biologique demande à prendre contact avec la Commission de Chimie macromoléculaire, transmis à Sir HARRY MELVILLE.

(ii) Les Présidents des Commissions de Nomenclature des Divisions de Chimie Physique, Inorganique, Analytique, Organique, Biochimique demandent la constitution d'un «Inter-Divisional Committee on Nomenclature and Symbols».

Aims: Exchange of Minutes, draft rules and documents concerned with systematic trivial nomenclature, abbreviations and symbols in order to coordinate terminology in all branches of chemistry.—The Chairmen of the Macromolecular and Clinical Chemistry Commissions to be asked to participate.—No financial aid.

(iii) Création dans la Division de Chimie Physique d'une *Commission on High Temperatures in Gases and on Plasma Chemistry.*

Exposé présenté par le Dr E. STARKMAN (USA) qui serait le Vice-président de cette nouvelle commission.

Le Comité de Division propose d'accepter la création de cette Commission pour *deux ans*; la question serait réexaminée en 1967 lors de la prochaine Conférence.

[Note from the Secretariat.
The last-mentioned proposal of the Division was not accepted by the Council.]

Prof. Dr. G.-M. SCHWAB

REPORTS OF THE COMMISSION CHAIRMEN, PROPOSALS, FORTHCOMING MEETINGS

I.1 Commission on Symbols, Terminology and Units

Report of Dr. WADDINGTON, Chairman.

Action Points

(i) Request for a special meeting in the autumn of 1966 in Paris to consider the final draft of the revision of the Manual of Symbols for Quantities in Chemistry. *Estimated cost: 2000 dollars.*

(ii) Request for modification of the wording of the definition of the *mole* approved by the Bureau of IUPAC as stated in part (b), Minute 19, recorded on page 18 of the Minutes of the 16th IUPAC-Bureau meetings, 23–25 March 1964. The new wording requested is:

> A mole is an amount of a substance, of specified chemical formula, containing the same number of formula units (atoms, molecules, ions, electrons, quanta, or other entities) as there are in 12 grams (exactly) of the pure nuclide ^{12}C.

(iii) The Commission is requesting that IUPAC recommend for use by Chemists *the numerical values of the fundamental constants* presented in the paper: Values of the Fundamental Constants for Chemistry, "Pure and Applied Chemistry", Vol. 9, No. 3, 453 (1964).

The Commission met on 30 June from 09.30 to 13.00 and 14.30 to 18.00; on 1 July from 09.00 to 13.00 and 14.50 to 18.00; on 3 July from 14.00 to 18.00; and 5 July from 09.00 to 13.00 hours.

Titular Members present were: GUY WADDINGTON, Chairman (USA), HENRI BRUSSET, Secretary (France), ROGER G. BATES (USA), W. JAENICKE (Germany), M.L. MCGLASHAN (UK), M. MILONE (Italy), K.J. PEDERSEN (Denmark), E.H. WIEBENGA (Netherlands).

Prof. J.I. GERASSIMOV (USSR) was absent because of illness. Associate Member SYÛZÔ SEKI (Japan) sent his regrets.

Dr. M.A. PAUL (USA) was present as an Observer. Prof. J. DE BOER, Secretary of the SUN Commission of the International Union of Pure and Applied Physics, was present all day on 1 July and Mme V. SIMONSGAARD, of the ISO TC/12 Secretariat, in the afternoon.

The Commission reviewed all sections of a draft revision of the Manual of Physicochemical Symbols and Terminology that incorporated changes, made at Copenhagen July 1964, of both substance and organization. It is now expected that polishing and reconciliation of a few difficulties will permit, after appropriate review, the presentation for approval of a final revised version of the Manual in 1967. The following paragraphs can only present a few of the more important points under consideration.

Regarding language, the decision was made to continue the parallel presentation in English and French as in the 1959 Manual. Active encouragement will be given to its translation into other languages.

A policy of working closely with the SUN Commission of IUPAP and ISO TC/12 was reinforced by the attendance of Prof. J. DE BOER and Mme V. SIMONSGAARD. Among agreements reached with them was to recommend for use by chemists and physicists (1) L, N_O, and N_A as alternative symbols for the Avogadro constant, and (2) the systematic use of lower case letters for specific quantities (divided by mass) and upper case for quantities in general with subscript to indicate "molar" when necessary. It was recognized

that IUPAP and IUPAC have differing recommendations for the symbols for the Gibbs and Helmholtz quantities. For chemists the 1961 IUPAC Council recommendation of G and A for these quantities stands.

A revision was attempted at the special Commission meeting in Copenhagen July 1964, of the 1953 Stockholm Convention for the sign of electromotive forces and electrode potentials. Subsequent review revealed sharply differing opinions on this version. A new statement will be prepared which will attempt to retain the simplicity of the Stockholm Convention and at the same time recognize that some of the definitions of terms involved, and new terms now in use, may be defined with greater rigour.

A new small essay section will be added to the Manual on activities and activity coefficients. This somewhat complicated area is badly in need of clarification.

A new section will include definitions of the six units [adopted by the 1960 General Conference on Weights and Measures (CIPM) which are the basis of the coherent system known as the International System (SI) of Units]. They are: the metre, kilogramme, second, ampere, degree Kelvin and candela. The mole will probably be added to this list, as a measure of amount of substance. The Commission recognizes the need for a definition of the mole acceptable to chemists and recommends that IUPAC endorse the following:

"A mole is an amount of a substance, of specified chemical formula, containing the same number of formula units (atoms, molecules, ions, electrons, quanta, or other entities) as there are atoms in 12 grams (exactly) of the pure nuclide ^{12}C."

The Manual will contain a section on the fundamental physical constants based on the article in "Pure and Applied Chemistry", Vol. 9, No. 3, 1964, pp. 453–459 by F.D. Rossini but modified to bring the presentation more into line with the SI system of units. In the meantime the Commission urges that IUPAC immediately recommend the use by chemists of the numerical values in the foregoing publication.

Two documents were reviewed by the Commission. One was "Recommended Symbols for Equilibrium Constants" prepared under the Commission on Equilibrium Data. The other, "Proposed Recommendations on Terminology in Ion Exchange" was prepared under the U.S. National Research Council Subcommittee on Ion Exchange Terminology. Apart from a few minor points, both were found to be consistent with the current recommendations of the Commission.

Concerning membership, Prof. J.I. Gerassimov completed 8 years of service in 1965 and will be replaced by another representative from the USSR. Prof. M.L. McGlashan was elected Vice-President. A decision was made to seek a limited number of Associate Members from Commissions having a special contribution to make to the work on symbols.

Opportunity for review of the revised Manual will be given to concerned groups. To consolidate changes and additions yet to be made, and to consider reviewers' comments, a special meeting of the Commission has been requested for late 1966.

Guy Waddington

I.2 Commission on Thermodynamics and Thermochemistry

Meetings were held on 2 and 3 July, 1965. The attendance was:

Titular Members: K. SCHÄFER (Chairman), GUY WADDINGTON (Secretary), C.W. BECKETT, H.A. SKINNER, S. SUNNER, and B. VODAR.
Absent: A.J. EDE and J.I. GERASSIMOV.

Associate Members: E. CALVET, J.D. COX, E.U. FRANCK, E.F.G. HERINGTON, J.P. MCCULLOUGH, A. MICHELS, F.D. ROSSINI, and F.E. WITTIG.

Observing Members (for 2 and 3 July, 1965): SELBY ANGUS, C.E. HOLLEY, Jr., M.L. MCGLASHAN, and MARTIN A. PAUL.

The Commission met in open session at 09.30–12.30 and 14.00–18.00 on 2 July, and 09.00–11.15 hours on 3 July. An Executive Session was held at 11.30–13.00 on 3 July. The Task Group on Skeleton Tables met all day on 1 July and the Task Group on Reference Materials met on the afternoon of 1 July.

Since 1961 when the Commission abandoned its two Sub-Commissions, it has conducted most of its work through 8 Task Groups. This has proven to be a most effective method for carrying on the diverse programs of the Commission. This summary of the 1965 Commission meetings is organized largely according to the individual reports of Task Group Chairmen and others associated with Task Group programs.

Task Group for the Bulletin (Chairman, H.A. SKINNER). The 1964 and 1965 issues of the Bulletin were of 330 and 300 pages (new condensed format) and printed at 1100 and 1200 copies respectively. IUPAC contributed $1000 toward costs of each issue. Other costs were met informally by participating organizations. A plan has now been proposed which, over a three-year period, can make the Bulletin self-supporting. The essential points are: (1) The Bulletin will be placed on a subscription basis; (2) a source of funds will be sought (e.g. from NSF) to cover the expected deficits of operations in the first three years; (3) the University of Michigan, where the editorial work and publication would center, would submit the proposal for funds and administer finances and distribution; and (4) IUPAC would have no financial involvement after the first two years for which $1000 and $500 respectively would be requested, and (5) the Commission would supply scientific guidance. If several administrative problems can be solved it is hoped to put the plan into operation for the 1966 issue of the Bulletin.

Task Group on Skeleton Tables of Thermodynamic Properties of Gases (Chairman, D.M. NEWITT). This project, approved by the Commission in 1961, became an actuality in 1964 when an initial grant from the USA made a modest start possible. The Ministry of Education and Science in the UK and CNRS in France are now providing two-thirds of the required funds and negotiations are in progress with several countries for the balance. The Task Group has had three meetings and organization of the work is well under way. Working Panels on carbon dioxide, the atmospheric gases, and on the correlation methods involved have been appointed. Other panels on hydrogen, the inert gases, and simple hydrocarbons are being formed. The Scientific Director is organizing bibliographies of reference materials and has visited a number of centers in several countries that will contribute to the work. The project center is at Imperial College, London, and is directed by Dr. SELBY ANGUS, who works closely with Professor Emeritus D.M. NEWITT.

Task Group on Reference and Calibration Standards (Chairman, C.W. BECKETT). It was reported that issuance of Al_2O_3 as a heat capacity standard, and THAM (tris- (hydroxymethy)-aminoethane) as a heat of mixing standard (with HCl) are being studied by the National Bureau of Standards. KCl and the benzene-carbon tetrachloride system as heat of mixing standards were also discussed.

It was recommended that work on tungsten and molybdenum (high temperatures), and copper (low temperature) as heat capacity standards, and the *n*-hexane, cyclohexane system as a heat of mixing standard be encouraged. Fluorobenzoic acid was suggested as an additional secondary heat of combustion standard and benzene as a vapour pressure standard. A study of the standardization of differential thermal analysis (DTA) measurements was recommended. The Task Group also points out the need for definitive studies of thermal conductivity measurements over an extended temperature range for selected liquids and solids.

The problem of calibration of pressure in the 25 to 150 kb range was reviewed. It was recommended strongly that the Commission take steps to stimulate research aimed at establishing an international pressure scale below and above 25 kb.

Task Group on the Temperature Scale (Chairman, C.W. BECKETT). The status of work on the International Temperature Scale was reviewed. Replacement of the sulfur point with the zinc point was encouraged. This action is expected in 1968. Research on replacement of the oxygen boiling point by the argon triple point is recommended but only if it does not interfere with more urgent work on revision of the temperature scale.

Task Group on Fundamental Constants (Chairman, F.D. ROSSINI). Attention was called to the paper "Values of the Fundamental Constants for Chemistry", Pure and Applied Chemistry, Vol. 9, No. 3, 1964, pp. 453–459 by F.D. ROSSINI, Chairman of the Task Group. The Commission moved that "IUPAC recommend the use by chemists of the numerical values of the fundamental constants given in the publication cited above". This resolution was presented to the Division Committee for consideration.

Task Group on Vol. I, Experimental Thermodynamics , Calorimetry of Non-reacting Systems (Chairman, J.P. MCCULLOUGH). The Editors, J.P. MCCULLOUGH and D.W. SCOTT, report that seven chapters are in the hands of the publisher, three are in the hands of the editor, and the remaining four are 90% complete. Publication of the volume by Butterworths is expected in early 1966.

Task Group on Vol. II, Experimental Thermodynamics of Non-reacting Fluids (Chairman, B. VODAR). Editors B. VODAR, J. SAUREL and A. LACAM. Planning of the book is well in hand. About 25 chapters are contemplated. The target date for publication is 1967.

Task Group on Symposia (Chairman, EDGAR, F. WESTRUM, Jr.). It was reported that the 1963 Symposium in Lund, Sweden, on Thermodynamics and Thermochemistry (seven sub-topics) was attended by 170 people and that the plenary lectures were published by Butterworths. More than 70 papers will be presented at the Joint IUPAC-IAEA Symposium on Thermodynamics with Emphasis on Nuclear Materials, to be held in Vienna, 22–27 July, 1965. Advance registration indicates an attendance of nearly 200. All papers presented, and edited discussion, will be published as a book by IAEA.

The Commission plans to hold a Conference in 1967 on Progress in Thermodynamics. An early selection will be made from the two or three organizations in Western Europe offering to serve as host.

After the reports by Task Group Chairmen, special topics were discussed as follows:

(1) Proposed International Journal of Thermodynamics and Thermochemistry. It was reported that widely based discussions have suggested consideration by IUPAC of the publication of a journal on chemical thermodynamics and possibly other specialized journals. The idea is strongly supported in smaller countries. It may be argued that such *international* journals might counteract the proliferation of specialized journals in individual countries. This topic will receive further consideration.

(2) The evaluation and compilation of numerical data for thermodynamics was reviewed. C.W. BECKETT reported that a revision of NBS Circular 500 will appear in 1966. This volume is the cornerstone of all chemical thermodynamic compilations since it contains key data at 25° for all elements, inorganic compounds and C_1 and C_2 organic compounds.

(3) F.D. ROSSINI reviewed major compilations from the ICT, initiated by IUPAC and the International Research Council (the forerunner of the International Council of Scientific Unions (ICSU) to the present significant continuing programs in the US, UK, USSR, France and Germany. He then reported on the current effort to establish in the International Council of Scientific Unions an international committee that will provide communications and liaison between all major countries and all international unions having compilation programs.

(4) H.A. SKINNER reported on the Gordon Conference in 1964 at New Hampton, New Hampshire, on "Critical Tables and Progress in Science", with considerable emphasis on thermodynamic tabulations. Key thermodynamic data was one topic discussed at the Conference. It was reported that a similar conference will be held in 1966 in the western United States under the chairmanship of Y.S. TOULOUKIAN. It was agreed that the evaluation and compilation of chemical thermodynamic data is a prime concern of the Commission.

(5) GUY WADDINGTON reported briefly on the work of the Commission on Symbols, Terminology and Units and urged continued efforts to replace noncoherent units by SI units.

In Executive Session elections of new members and officers were held. The results are: Chairman, H.A. SKINNER (UK); Secretary, S. SUNNER (Sweden); New Members: E.U. FRANCK (Germany); F.D. ROSSINI (USA) and J. SAUREL (France). Holdover members are C.W. BECKETT (USA), A.J. EDE (UK), J.I. GERASSIMOV (USSR). The following were designated as Associate Members: J.D. COX (UK), M. COLOMINA (Spain), L. DEFFET (Belgium), W.N. HUBBARD (USA), I.G. MURGULESCU (Rumania), M.L. MCGLASHAN (UK), K. SCHÄFER (Germany), N. TANAKA (Japan), B. VODAR (France), G. WADDINGTON (USA), EDGAR F. WESTRUM, Jr. (USA), and one additional from the Soviet Union. The retiring president, K. SCHÄFER, thanked all members for their support and gave special thanks to B. VODAR and G. WADDINGTON who have completed 8 year terms. The Commission expressed thanks to Professor SCHÄFER for his excellent leadership during his incumbency.

G. WADDINGTON

Report of Prof. SCHÄFER, Chairman.

Action points:

(i) The Commission requests authorization to *place the "Bulletin of Thermodynamics and Thermochemistry" on a subscription basis.* Editorial, printing and distribution work would be centered on the University of Michigan. Underwriting of deficits for three years would be required. The University of Michigan would seek funds for this purpose. The Commission would continue as the scientific sponsor. If this plan can be implemented IUPAC will be asked for *1500 dollars* ($1000 first year, $500 second year) over the next two years. After that no subvention would be required from IUPAC.

[Note from the Secretariat.
This proposal was rejected by the Bureau at its meeting in Moscow at the time of the XXth Congress.]

(ii) Moved that IUPAC recommend for use by Chemists the *numerical values of the fundamental constants* [see under I.1 (iii)].

(iii) Request permission to hold a *Symposium on Progress in Chemical Thermodynamics in 1967* at a location in or near London or Heidelberg. The details remain to be arranged. A symbolic contribution from IUPAC will be required (500 dollars).

I.3 Commission on Electrochemistry

The Commission of Electrochemistry met in Paris in the afternoon on 1 July and for the whole day on 2 July.

The first session was devoted to the discussion of the reorganization of the Commission and of its relations with CITCE, a topic which had been already the subject of an intensive exchange of views by correspondance prior to the meeting. A resolution in this matter was taken, the text of which follows (Appendix A). It was approved by the Division of Physical Chemistry on 7 July. The new rule for the nomination of the Members of the Electrochemistry Commission will ensure a close cooperation with CITCE. In future, the Commission will no longer have Sub-Commissions. The work hitherto done in these Sub-Commissions will be carried out by corresponding commissions or groups of study of CITCE and reported to the IUPAC Commission on Electrochemistry.

On 2 July the CITCE report on electrochemical definitions and nomenclature was discussed. Dr. BATES summarized the views of the Commission on Symbols, Terminology and Units on certain parts of the CITCE report. At the end of this report are given (Appendix B) the formal decisions which were taken on behalf of the CITCE report and of the Copenhagen draft of 1964 prepared by the IUPAC Commission on Symbols, Terminology and Units.

Prof. FISCHER reported on the activity of the Sub-Commission for Kinetics during the last years and on the plans for a critical survey of data of electrode kinetics. The future work will be performed by a study group of CITCE to be created.

The terms of office of all Titular Members expired by the time of the Paris Conference. Since the new rules for the nomination of members could not yet be applied it was decided that all new terms of office would be restricted to two years.

Prof. Dr. N. IBL (Secretary)

Appendix A

The Commission adopts the following resolution:

(1) The IUPAC Commission on Electrochemistry continues to exist.
(2) Whenever a Titular Member is to be elected, the IUPAC Commission on Electrochemistry should solicit proposals from CITCE. The latter will propose qualified candidates regardless of whether they are CITCE members or not.

Similarly, CITCE will make proposals for Associate Members according to the needs which may arise.

P. van Rysselberghe, President and
N. Ibl, Secretary of the IUPAC
Commission on Electrochemistry

Appendix B

The Commission decides to let the CITCE report, as published in the November 1964 number of *Electrochimica Acta*, represent the views of the Commission at this time. This report will not be submitted to the Physical Chemistry Division at the present time.

In regard to a possible revised presentation of the Stockholm recommendation of 1953 the Commission declares itself in agreement with the spirit, if not with the entire form of the Copenhagen draft of 1964 prepared by the IUPAC Commission on Symbols, Terminology and Units. Dr. E. Lange, Associate Member, has some reservations concerning points of detail in this draft.

I.4 Commission on Macromolecules

The Commission has met on two occasions since the last report, once in Paris in July 1965 for a formal meeting, and once in Prague in September 1965, when an informal meeting was held. On these occasions the Agenda were similar and the major considerations facing our Commission were the co-ordinating and publicising of future meetings; the programmes on standard samples; and the collaboration and work on nomenclature.

The Commission has agreed that it will be advisable to arrange future meetings concerned with Macromolecular Chemistry in such a way as to obtain a reasonable geographic distribution and to ensure that the meetings of the Commission do not clash with international symposia; and it was further agreed that the annual meetings should be held on restricted topics. We have suggested that meetings be held in 1967 in Belgium and in 1968 in Hungary. The meeting in Belgium will be upon "The Chemistry of the Internal Structure of High Polymers" and the meeting in Hungary will be upon the kinetics and mechanism of polymerization and degradation reactions.

We hope to co-ordinate the holding of meetings by the publication in regular journals in the field of polymer science of notices of meetings on polymer science held in any of our adhering countries, and it is hoped that in this way the usefulness of our Commission will be greatly increased. We have agreed also that papers from our meetings should be regularly published either in "Pure and Applied Chemistry" or in other recognized journals should the editors agree. In this way it is hoped that a number of specialized volumes on polymer science become generally available and not only to those who attend commission meetings.

In considering the programme of standard samples; standard methods; fundamental constants; the work on polystyrene and solution properties; and the expansion of these programmes to solid state measurements and block copolymers it was decided that the results of examination of low molecular weight samples should be published in the "Journal of Polymer Science". Because of the storage problems concerned with the first distribution of high molecular weight samples it was decided that a new sample of polystyrene of molecular weight 1 million would be prepared, by courtesy of the Dow Chemical Company, and distributed as before, but storage conditions will be more stringently controlled. It was further agreed that a limited number of national laboratories would then act as distribution centres for these samples. These laboratories would be
the National Bureau of Standards;
Centre de Recherches sur les Macromolecules, Strasbourg;
an Institute of the Soviet Academy of Sciences;
Kyoto University.

In view of the difficulties of measuring certain basic physical properties of solid polymers, for example transition points, melting points, and nuclear magnetic resonance spectra, it was decided that this topic should be thoroughly discussed during the 1967 meeting in Brussels and in the meantime it was agreed that there would be consultation between the Commission on Macromolecules, IUPAP, and the Commission on Plastics and High Polymers of IUPAC.

In considering the work on Nomenclature it was agreed that there was a pressing need for continuation and the Subcommittee on nomenclature should be reinstated with as members: Prof. Huggins, Prof. Corradini, Prof. Desreux and Prof. Mark.

It was decided that collaboration should be encouraged between the Joint Biochemical Nomenclature Committee and the Commission on Macromolecules by an exchange of reports on high polymer nomenclature including both natural and synthetic materials.

Following discussions on the election of a Chairman and Secretary for the Commission it was agreed that a ballot would be held and this ballot would be arranged by Sir Harry Melville, President of the Physical Chemistry Division and would be scrutinized by Dr. Morf of the IUPAC Bureau. It was hoped that the results of this ballot would be available in time for the inclusion of the elections to these offices in the *Comptes Rendus*.

H. W. Melville

I.5 Commission on Data and Standards

Meetings of the Commission were held in Paris on 2 and 3 July 1965.

(1) Membership of the Commission: The Commission unanimously nominated Dr. T. Plebanski to serve as a Titular Member for a further four years. Dr. A. L. G. Rees having expressed a wish not to be nominated for a further four-year period, the Commission unanimously agreed to nominate the following two new Titular Members:

(i) Dr. I. Brown, CSIRO, Dominion of Physical Chemistry the Chemical Research Laboratories, Box 4331 GPO, Melbourne (Australia).

(ii) Dr. W. Wayne Meinke, Analytical Chemistry Division, National Bureau of Standards, Washington, D.C., 20234 (USA).

Dr. C.P. SAYLOR ceases to be a Titular Member, but the Commission was very anxious that his association with it should continue, and accordingly nominated him as an Associate Member for a period of four years.

(2) In view of the recent redefinition of the litre, the Commission considered that it was most desirable to encourage a precise re-determination of the density of water. The Commission proposes that a formal approval should be made to the National Physical Laboratory, Teddington Middlesex (UK), preliminary enquiries having suggested that such a request would be sympathetically considered.

(3) Dr. SAYLOR reported on the position about the publication of the Ottawa Symposium on Purity Control. This has been held up by the delay in the despatch of manuscripts to Dr. SAYLOR from two contributors, but he stated that he will resolve these difficulties within the next two months.

(4) Dr. SMIT reported on the progress made in attempting to organize a co-operative study of viscosity. He stated that the Rheology Panel of the Institute of Petroleum is in possession of valuable information relevant to this project and it was agreed that Dr. SMIT should approach the Institute of Petroleum to try and seek agreement on future common procedure.

In view of the increasing international interest in the whole matter of viscosity standards, the Commission agreed that the promotion of an internationally approved viscosity scale should be one of the Commission's future activities. In particular, the Commission is very anxious that agreement should be reached on the viscosity of water, since this must be an essential standard in a viscosity scale.

(5) The Commission strongly supported the proposal received from Dr. WADDINGTON that IUPAC should formally recommend the use of the values of the Fundamental Constants for Chemistry published by F.D. ROSSINI (journal, "Pure and Applied Chemistry" 1964, 9, 4).

(6) Dr. STULL had circulated to Commission members draft copies of the report on "Standardized Materials for Physicochemical Measurements" from the Sub-Committee of Physicochemical Standards of the National Academy of Sciences and the National Research Council. He stated that the publication of the report was expected soon. The Commission warmly welcomed this news and hoped that the publication of this report would stimulate other national bodies to give similar publicity to the availability of standard substances in their own countries. It is hoped that such bodies will keep in touch with the Commission on this matter, either via Dr. STULL or Dr. SMIT.

(7) Dr. REES reported on the possibility (first raised at the London meeting in 1963) of compiling a set of definitive ionization energies. It was agreed that such a compilation would be better postponed until developments in technique have crystallized and complete agreement has been reached on the interpretation of the experimental data.

(8) The Commission considered at considerable length the proposal to produce a report or monograph on the determination of chemical purity. It was agreed that by so doing the Commission could render a valuable service to chemists in all countries and all members were in favour of proceeding with the project, the chief features of which are as follows:

(i) The title of the report or monograph should be "The Characterization of Chemical Purity Organic Compounds".

(ii) The estimated length is approximately 150 pages of the journal of "Pure and Applied Chemistry".

(iii) The object of the report will *not* be to provide a chemist with a complete handbook on chemical purity with full experimental details, which would clearly be impossible in the compass of 150 pages. It will consist of a series of articles on the more widely used methods and techniques by which chemists attempt to assess the purity of the substances they work with. The writers of these articles (while giving adequate references for experimental details) will primarily be concerned with analysing the advantages, disadvantages, and range of applicability of these various techniques and methods. Other articles will deal with subjects such as the meaning of chemical purity and the use and availability of standard samples. It is hoped that the publication of this report will lead to a better appreciation of the various criteria of chemical purity and to an improvement in the way such criteria are used in the writing of original papers, to less disagreement between authors and referees of papers on matters of purity and perhaps to more informative and useful statements from chemical manufacturers about the purity of their products.

Dr. Staveley reported that he had already secured provisional promises from eleven contributors, and that he had had preliminary discussions with Prof. H.W. Thompson about publication. The Commission hopes that the first drafts of contributions might be ready by the end of March 1966 and the manuscript in its final form by June 1966.

(9) The Commission discussed other possible future activities.

(i) Dr. Staveley reported that he had been asked if the Commission would be interested in the production of a critical compilation of data relating to the critical state. It was agreed to discuss this with Dr. Haddington before taking any further action.

(ii) It was agreed that it was desirable to resolve some ambiguities which still exist in the meaning of certain terms and in the choice of certain units. Dr. Rees and Dr. Plebanski will be asked to compile a list of such terms and units.

(iii) It was agreed that it is desirable to promote greater uniformity of the physical conditions under which certain properties of substances and quantities relating to chemical reactions are measured. Although this matter will be dealt with to some extent in the project outlined in item (8) above, the Commission felt that, independently of this project, it would be very valuable to publish a short statement of perhaps two or three pages, drawing attention to the desirability of standardizing physical conditions when measuring such properties as refractive index, density, viscosity, surface tension, and boiling point. The Commission intends to suggest that there should be two standard temperatures of 20 and 25 °C, and that chemists who record values at one of these temperatures of any of the first four properties listed should be encouraged to record also the temperature coefficient of this property. With regard to boiling-point determinations, the intention of the Commission is to recommend as a standard pressure one atmosphere or its equivalent in millibars, and suitable lower pressures decreasing in each case by a factor of between 5 and 10. Before seeking to be more precise on these points, however, the Commission would value the comments and suggestions of other interested Commissions.

(iv) The Commission discussed the possibility of sponsoring in due course a report on methods of purification. It decided to defer further consideration of this for two years as it considers that during this period the time its members can give to Commission activities will be fully used in dealing with the other projects mentioned in this report.

L.A.K. Staveley (Chairman)

I.6 Commission on Molecular Structure and Spectroscopy

A Meeting of the Commission was held in Paris on 3 July 1965.

Titular Members present: R.C. LORD, Chairman (USA), R.N. JONES, Secretary (Canada), J. LECOMTE (France), R. MECKE (Germany), S. MIZUSHIMA (Japan), H.W. THOMPSON (UK).

Letter of apology received from A. TARENIN (USSR) for inability to be present.

(1) Only Titular Members were present and the session was for business purposes only. The Commission and its Sub-Commissions will meet in technical sessions at the 8th European Congress on Molecular Spectroscopy in Copenhagen on 13 and 14 August, 1965.

(2) Welcome to Paris was tendered by J. LECOMTE.

(3) Reports by H.W. THOMPSON and R.N. JONES were given on informal meetings of the Sub-Commissions on Storage and Retrieval of Spectral Data and on Infrared Intensities, held during the Gordon Conference on Infrared Spectroscopy in Meriden, N.H., (USA) in August, 1964. During discussion of these reports it was the unanimous opinion of the members that a unilateral programme for the collection and dissemination of standard spectroscopic data such as that contemplated under the Standard Reference Data Programme of the US Bureau of Standards would be unfortunate by virtue of the fact that the specifications for obtaining and presenting the data might be set up without regard to formal or informal agreement with other countries or international bodies such as this Commission.

(4) A report was given of the meeting of the Triple Commission on Spectroscopy, IUPAC, IUPAP and IAU in Hamburg, Germany, in September, 1964. H.W. THOMPSON, currently Chairman of the Triple Commission, and R.N. JONES, the second representative of the IUPAC Commission, agreed that there was a divergence of opinion among the representatives of the different Unions about the *modus operandi* of the Triple Commission. It was agreed after discussion that the IUPAC representatives should press the view that the proper function of the Triple Commission is to review and coordinate the overlapping spectroscopic activities of the individual Unions. Specifically the meetings of the Triple Commission should not be devoted to programmes of scientific papers by the members and others.

(5) R.N. JONES presented a final draft copy of the "Multilingual Dictionary of Important Terms in Molecular Spectroscopy" in English, French, German, Japanese and Russian. This was prepared by the Sub-Commission on Units and Terminology under the direction of G. HERZBERG. It will be reproduced and distributed at no cost to the Commission through the courtesy of the National Research Council of Canada.

I.7 Commission on Colloid and Surface Chemistry

Minutes of Meeting in Paris, 2 July, 1965

(1) Those *present were:* Sir ERIC K. RIDEAL, Chairman; Dr. W.A. ZISMAN, Secretary; Prof. J. TH. OVERBEEK, Member; Prof. J. HORIUTI, Member; Academician M.M. DUBININ, Member; Prof. B. KAMIENSKI, Member; Prof. D.G. DERVICHIAN, Member; Prof. M. PRETTRE, Associate Member; Prof. G. SCHAY, Associate Member; Prof. F. SEBBA, Associate Member; Prof. K.G. MYSEL, Associate Member; Dr. H. VAN OLPHEN, invited Ob-

server; and Prof. G. M. SCHWAB, President, Division of Physical Chemistry, IUPAC.

(2) The Chairman welcomed the attendees and expressed regret that Prof. A. E. ALEXANDER and Prof. B. HAUL could not come. He outlined the history and objectives of the Commission as well as the first Commission report to IUPAC in London in July 1963. The meeting tasks were as follows:
(i) to review the report of Prof. OVERBEEK's Sub-Commission on Colloid Systems in view of the excellent progress to date;
(ii) to review the brief report of 2 April, 1963, by Prof. ALEXANDER's Sub-Commission on Liquid Interfaces, which report had been merged with that of OVERBEEK and would be presented as a joint report;
(iii) to review the status of the work of Academician DUBININ's Sub-Commission on Solid/Gas Interfaces; and
(iv) to review the recently submitted revised report of March 15, 1965, submitted by Prof. J. HORIUTI's Sub-Commission on Heterogeneous Catalysis. Sir ERIC also stated that before concluding the meeting on Saturday 3 July, 1965, it would be necessary for the Commission to make recommendations to IUPAC on the desirability of continuing the Commission and, if continuation is urged, on the membership and officers for the next four years.

(3) Before considering progress of the Sub-Commission, the Chairman discussed the concurrent efforts of the Committee on Colloid and Surface Chemistry of the National Academy of Science and the National Research Council (NAS-NRC) of the USA. As Dr. VAN OLPHEN of that Committee was an invited Observer, Sir ERIC called on him for brief remarks. In response, Dr. VAN OLPHEN stated that the NAS-NRC Committee, under the chairmanship of Prof. ALBERT ZETTLENOYER, was organized after IUPAC created the Commission on Colloid Chemistry for the following purposes:
(a) to give support to the IUPAC Commission and
(b) to encourage the teaching and research support of colloid chemistry in the USA. VAN OLPHEN's Sub-Committee on Tables of Critical Constants had been created to obtain much needed, selected, critical data of importance in colloid and surface chemistry, which effort appeared to be too expensive for the present very limited resources of IUPAC. Compilations and critical appraisals of the existing data of colloid and surface chemistry were under way in five projects financed by NAS-NRC, two projects in Europe and three in the USA. This work was being carried on by the leading experts in the field, regardless of nationality. Before publication of the reports, the data would be submitted for review and comment by the appropriate experts of the IUPAC Commission on Colloid and Surface Chemistry. Finally, the critical data would be published in a bound report by the NAS-NRC through the National Data Collection group of Dr. BRADY at the National Bureau of Standards. Dr. VAN OLPHEN concluded by expressing the hope that his Sub-Committee effort would continue to receive the technical cooperation of the IUPAC Commission.

(4) Sir ERIC called on Prof. OVERBEEK to discuss his joint report with Prof. ALEXANDER on the Terminology and Symbols of Colloid Chemistry. Prof. OVERBEEK remarked that the terminology and symbols to be presented also relate in part to the areas of interest of the Commissions on Electrochemistry and Macromolecules; therefore, he wondered whether his report should not be reviewed after this meeting with members of both of these Commissions. After their mutual problems had been resolved, the resulting report could be submitted to the President of the Division of Physical Chemistry of IUPAC. In reply Prof. SCHWAB said the simplest way to

operate would be to submit the report to Dr. GUY WADDINGTON's Commission on Nomenclature and Terminology, which already has contact with the Commissions on Electrochemistry and Macromolecules. Sir ERIC therefore stated that Prof. OVERBEEK's report would be submitted to Prof. SCHWAB for information, and also to Dr. WADDINGTON for co-ordination with the Commissions on Electrochemistry and Macromolecules. Prof. OVERBEEK asked what procedure should be followed in publishing the report of his Sub-Commission. Prof. SCHWAB replied that the report, once approved by Sir ERIC's Commission, should go to IUPAC and then in two years it would be published in "Pure and Applied Chemistry". However, he pointed out that if the Commission wished, they could have this report published in the same journal as a "Preliminary Report" and also obtain wider comment and discussion in the scientific community. It was finally agreed that the latter procedure was preferred by the Commission on Colloid and Surface Chemistry. Prof. SCHWAB then suggested that Sir ERIC alert the IUPAC Committee on Publications to the fact that OVERBEEK's report was nearing readiness for preliminary publication.

(5) Dr. VAN OLPHEN remarked at this point that when his NAS-NRC Sub-Committee had completed their draft of the critical tables, they could be submitted for preliminary publication in the IUPAC journal "Pure and Applied Chemistry". Prof. SCHWAB's reply was that this could be done as far as he could see.

(6) Prof. OVERBEEK proceeded to review in detail his report, with emphasis on those topics which had occasioned critical comments from the Commission Members or from other interested parties, including Prof. LA MER's NAS-NRC Sub-Committee on Colloid Terminology. The remainder of the Friday meeting was taken up with a thoughtful and productive discussion of these detailed technical problems. As a result, when the meeting adjourned at 7.30 p.m., all points which had been disputed were satisfactorily settled by the Commission. Prof. OVERBEEK thanked those present for their valuable comments and ideas, and said that he could now revise the report to meet all the objections voiced in the past. He much appreciated the efforts of those present as well as those received from his Sub-Commission members.

(7) Sir ERIC RIDEAL then adjourned the meeting, reminding the Commission that they had much to do on Saturday, and he therefore hoped they would be present at 9 o'clock.

Minutes of the Meeting on Saturday, 3 July, 1965

(1) All those present at the Friday meeting were present again on Saturday.

(2) Sir ERIC RIDEAL opened the meeting by reminding the Commission that they must review the reports of Prof. HORIUTI's Sub-Commission on Heterogeneous Catalysis and of Academician DUBININ's Sub-Commission on the Solid/Gas Interface, in that order, following which attention would be given to the future of the Commission and its membership. Since on Friday agreement had been reached on definitions and symbols for liquid surfaces, it would be necessary to employ them whenever possible in discussing solid surfaces and their properties. He also emphasized that in reviewing the remaining two Sub-Commission reports we should stress symbols and terminology, leaving other technical problems for later discussion.

(3) Prof. HORIUTI reviewed the problems not resolved fully in preparing the report of his Sub-Commission. There were several very fundamental points which needed discussion by the Commission before further progress

could be obtained. These included topics such as the "activated complex" and "critical states". A lengthy discussion followed which did much to clarify the subject for all concerned. At the conclusion, Prof. HORIUTI expressed his thanks for the helpful discussion. He thought that a report from his Sub-Commission could be completed before the next meeting.

(4) The Chairman called on Academician DUBININ to discuss the work of his Sub-Commission on the Solid-Gas Interface. Prof. DUBININ said that the work had proceeded slowly at first but was moving along well now. Although the recent draft of Prof. EVERETT's ideas on gas adsorption on solids and the thermodynamics of the solid-gas interface was a valuable contribution, it needed further study and discussion by the Sub-Commission. This work should and would proceed. Sir ERIC suggested that since some of the definitions and terms in Prof. EVERETT's report were closely related to some of those in OVERBEEK's and HORIUTI's report, it would be valuable to send a copy to OVERBEEK and to HORIUTI. Prof. DUBININ agreed to this suggestion, and hence Sir ERIC asked the Secretary to see that each received a copy.

(5) The Chairman pointed out that except for that of Prof. DUBININ, the appointments of all of the Commission members were now expiring, and this included his appointment. He believed the Commission was doing valuable work, and although much had already been accomplished, several tasks of importance still lay ahead; therefore he recommended the continuation of the Commission. Prof. SCHWAB replied that he fully agreed with Sir ERIC, and believed that the IUPAC officers would also agree. Next, Sir ERIC said he felt that some people on the present Commission should continue, and others, whose contributions had been made, should go off to allow other people to be appointed whose special knowledge was needed. In solving problems yet to be resolved. Actually, the work on liquid interfaces was completed, but much work was yet to be done on solid interfaces. Therefore, the present four Sub-Commissions should be condensed into two, one concerned with solid surfaces, and one with liquid surfaces; in other words, OVERBEEK's and ALEXANDER's Sub-Commissions should be merged, and HORIUTI's and DUBININ's should be treated likewise. Finally, as he was now 75 years old and believed the Commission needed people who are contemporaries with up-to-date information about current problems, he would like to submit his resignation.

(6) Prof. SCHWAB replied that according to the rules of IUPAC, every member of the present Commission is eligible to continue; furthermore, it is up to them to elect members and also elect their officers. He added that IUPAC now considers it desirable for each Commission to have a Vice-Chairman in addition to a Chairman and a Secretary. He emphasized that the Vice-Chairman need not later succeed the Chairman in office.

(7) Prof. OVERBEEK then said he had been most happy with Sir ERIC RIDEAL's Chairmanship and would like to nominate him as Chairman for another term. Dr. ZISMAN seconded the motion and added that Sir ERIC was much needed to complete the difficult work immediately ahead; although Sir ERIC's biological age was 75, he was mentally very much younger and was a most inspiring leader. Sir ERIC replied by expressing his thanks and remarking that he would serve another two years if his health permitted, but at the end of that time a new Chairman should be chosen. However, he said that Dr. ZISMAN has done so much to help him and the Commission that he did not feel able to continue without his serving as Commission Secretary. Dr. ZISMAN replied that of course he would be glad to continue as Secretary under these circumstances.

(8) With these two nominations approved by the Commission, Sir ERIC turned to the subject of the continuance of the other Commission members. At this point Prof. OVERBEEK remarked that it would be inadvisable to drop members who are still actively working on unresolved problems, but he agreed with the Chairman's earlier suggestion that half of the Commission members should be changed each term, and therefore suggested that half be changed each term, and therefore suggested that half be changed two years hence. Sir ERIC asked Prof. SCHWAB if there was any reason why the Chairman or the Sub-Commission Chairman could not continue another two years rather than the usual four-year term. Prof. SCHWAB read the IUPAC rules and concluded that a two-year membership is possible, but it *could* be four years. Sir ERIC then stated that he believed the Commission had arrived at the stage where he could now merge the four Sub-Commissions into two for the next two years, and he would proceed to form one on liquid interfaces and one on solid interfaces.

(9) Prof. DERVICHIAN then nominated Prof. OVERBEEK as Vice-Chairman of the Commission. Dr. ZISMAN seconded the motion. There was unanimous approval, for which Prof. OVERBEEK expressed his thanks.

(10) Sir ERIC suggested that Prof. DUBININ and Prof. HORIUTI combine their Sub-Commissions into a single Sub-Commission concerned with solid interface. As this was agreed, he asked Prof. DUBININ if he would be willing to serve as the Chairman and asked Prof. HORIUTI if he would be willing to serve as Vice-Chairman of the new Sub-Commission. Prof. DUBININ replied that he was not fully qualified to cover the subject of catalysis, but felt that with the help of Prof. HORIUTI and the others he would do his best to serve as Chairman. Prof. HORIUTI said that this arrangement was satisfactory, and he was willing to serve as Vice-Chairman of the combined Sub-Commission.

(11) Prof. DERVICHIAN pointed out that inasmuch as the field of colloid and surface chemistry to which he was closest had been well covered by the work of the Commission, he would be glad to retire from the Commission in order to make way for the appointment of someone who could help with the work yet to be done. Sir ERIC thanked Prof. DERIVICHIAN for his co-operation and for his past valuable help. He agreed that with the need for more emphasis on the problems of solid surfaces, it would be desirable to appoint an expert in the field of heterogeneous catalysis. He asked Prof. PRETTRE if he would be willing to serve on the Commission. Prof. PRETTRE indicated he would be very pleased to serve. Prof. DERIVICHIAN said that he would be happy to assist at any time his services could be helpful. Sir ERIC expressed his sincerest thanks to both.

(12) The Chairman asked Prof. KAMIENSKI if he would be willing to continue to serve as a Commission member. Prof. KAMIENSKI replied that he had enjoyed serving and would be happy to continue.

(13) Dr. ZISMAN pointed out that since Prof. ALEXANDER had had a serious health problem in his family two years ago which prevented his attending the London meeting of the Commission, and since he was unable to attend the Paris meeting, it would seem desirable to replace him by some expert who could be more active. It was unfortunate he could not serve, since his help would have been so valuable. However, it was likely that replacing him would be a relief to him under the circumstances. Dr. ZISMAN therefore nominated Prof. EVERETT as Commission member, in view of the excellent contribution made by Prof. EVERETT in his recent report to Prof. DUBININ, and because of the need for concentrating Commission effort on the solid-gas interface. Sir ERIC asked Prof. SCHWAB

and the members how they thought IUPAC would view the appointment of two Englishmen on the same Commission. Prof. SCHWAB said that IUPAC has been stressing the need for selecting the most expert people available, regardless of other considerations. Consequently, the Commission approved the nomination of Prof. EVERETT, subject to his willingness to serve.

(14) Sir ERIC then announced that in the past all of the Commission members had not adhered to the policy laid down four years ago that copies of all correspondence involving the work of the Commission or Sub-Commissions should be sent to the Secretary. He emphasized that they should do better about observing this rule in the future. He wanted them to know that because he lacked secretarial and other office services as Prof. Emeritus at the University of London, he had to lean heavily on the Secretary of the Commission for support in all ways, including correspondence, duplication, typing, files, etc.

(15) In closing the Commission meeting for 1965, Sir ERIC expressed to the members and others present his sincere thanks for their valued and most cooperative effort. In his opinion the Commission was moving along well, had accomplished much, and showed every promise of completing the tasks that were ahead. He also appreciated their confidence in renominating him as Chairman but would continue to lean on them heavily for support and ideas. He asked the Secretary to prepare letters from the Commission to the management of Mobiloil of France and of Unilever, expressing our thanks for their courtesy in arranging the two excellent luncheons on Friday, 2 July, and Saturday, 3 July. They had been delightful hosts and had done much to help us get better acquainted with one another, and so had promoted the work of the Commission.

Sir ERIC K. RIDEAL (Chairman)
W. A. ZISMAN (Secretary)

I.8 Commission mixte de radio-activité appliquée

Depuis le dernier compte rendu d'activité, la Commission mixte de radio-activité a tenu deux réunions, l'une à Athènes le 7 décembre 1963, l'autre à Vienne le 12 décembre 1964.

Les principaux sujets abordés au cours de ces réunions ont été les suivants :

(1) Participation à des colloques ou conférences. – La Commission émet son avis sur l'ordre d'intérêt présenté par les différentes réunions prévues au programme de l'Agence internationale de l'énergie atomique.

(2) Etalons de radium HÖNIGSCHMID. – Après examen de la situation des étalons de radium préparés par HÖNIGSCHMID, la Commission a estimé que cette situation était satisfaisante. L'un de ces étalons est maintenant conservé par le Bureau international des poids et mesures.

(3) Décomposition des composés organiques marqués: La conférence organisée par Euratom en novembre 1963 a permis de faire le point sur les problèmes de préparation et de stockage des composés marqués. – L'Agence internationale de l'énergie atomique a, de son côté, entrepris une étude sur le contrôle de la pureté des radio-éléments destinés à l'usage médical. – Ces travaux vont dans le sens des recommandations de la Commission.

(4) Compilation des périodes radio-actives: L'Agence internationale de l'énergie atomique n'a pas encore pu faire réaliser la compilation des données concernant les propriétés des principaux radionucléides en vue de définir des valeurs internationalement reconnues. Il a été proposé que ce travail soit fait en collaboration entre différents laboratoires.

II. INORGANIC CHEMISTRY DIVISION

REPORT ON THE ACTIVITY DURING THE PARIS CONFERENCE

Minutes of the Meeting of the Division of Inorganic Chemistry including the Commission Chairmen, Paris

1 July, 1965, 16.00 hours

held in the Conservatoire des Arts et Métiers, 292, rue St-Martin, Paris 3e

Present: Prof. J.H. de Boer (President), Prof. J. Benard (Vice-President), Prof. V. Gutmann (Secretary), Prof. J.S. Anderson (Member), Prof. O. Glemser (Member), Prof. R.W. Parry (Member), Prof. G. Schwarzenbach (Member), Prof. B.J. Trzebiatowska (Member), Prof. J.C. Bailar Jr. (Treasurer, *ex-officio* Member), Dr. E. Wichers (Commission Chairman), Prof. K.A. Jensen (Commission Chairman), Prof. G. Chaudron (Commission Chairman), Dr. B. Lewis (Commission Chairman), Prof. E. Starkman (Commission Secretary).

Apologies of absence were received from: Prof. H.J. Emeléus (Past-President), Prof. V. Caglioti (Member).

Absent: Prof. V.I. Spitzyn (Member).

(1) After words of welcome the President opened the meeting and made announcements concerning reimbursement and elections in the Commissions. He drew the attention to the need for complete membership lists, which must be in the hands of the Division by Monday, 5 July, 12.00 hours. A list of attendees is also to be submitted as soon as possible. Provisional minutes of the Commission-work including all important decisions which need action by the Council and which involve financial considerations must also be submitted by Monday, 5 July, noon.

(2) The Agenda for the Commission of Atomic Weights was discussed and approved.

(3) The Agenda for the Commission on Nomenclature was approved. The presence of Prof. Jensen as an Observer at certain meetings of the Commission on Nomenclature of Organic Chemistry was also approved and financial reimbursement was recommended. The continuation of this Commission was approved for the period 1965–1969, and will be recommended for approval by the Council.

(4) As Prof. Chaudron was about to resign as a Chairman of the Commission on High Temperatures and Refractories, the President thanked him warmly for his activities, which was greeted with applause. Prof. Chaudron expressed his thanks.

(5) The work done by the Commission on High Temperatures and Refractories (both Sub-Commissions) was critically reviewed and the Commission Chairmen asked to draw up a programme for future activities in accordance with the IUPAC statutes. The possibility of uniting the 2 Sub-Commissions should also be examined.

The President expressed the view that the work done by the two Sub-Commissions did not comply with the activities for which Commissions could be formed, according to the statutes. He suggested a reforming of the

two Sub-Commissions into one single Commission, consisting of a Chairman, a Secretary and about 7 Members. Probably no elections would then be necessary. Because so many Members were resigning and were not eligible for re-election, then the remaining number of Members might be sufficient. In that case he suggested to apply for a continuation for 2 years in order to study if there were a reason to maintain the Commission.

Dr. LEWIS reported on the plans for the Plasma Symposium to be held in Moscow in July 1965; the work was taken over by the Russian colleagues, however.

(6) The dissolution of the Commission on Geochemistry was finally endorsed.

(7) The meeting was closed at 18.15 hours in good order.

Minutes of the meeting of the Division of Inorganic Chemistry, Paris

1 July, 1965, 18.15 hours

held in the Conservatoire des Arts et Métiers, 292, rue St-Martin, Paris 3e

Present: Prof. J.H. DE BOER (President), Prof. J. BENARD (Vice-President), Prof. V. GUTMANN (Secretary), Prof. J. S. ANDERSON (Member), Prof. O. GLEMSER (Member), Prof. R.W. PARRY (Member), Prof. G. SCHWARZENBACH, (Member), Prof. B.J. TRZEBIATOWSKA (Member), Prof. J.C. BAILAR (*ex-officio* Member), Prof. G. CHAUDRON (by invitation).

Apologies for absence were received from: Prof. H.J. EMELÉUS (Past-President), Prof. V. CAGLIOTI (Member).

Absent: Prof. V.I. SPITZYN (Member).

(1) Prof. DE BOER opened the meeting and announced the retirements of Prof. H.J. EMELÉUS and Prof. V. CAGLIOTI. Careful consideration was given to their replacements. Since the term of offices of both the President and the Secretary will end in 1967, when Prof. BENARD, Paris, will become President, it was suggested that one of the replacements should be made for the presumptive Secretary for the period 1967–1971. Prof. R. COLLONGUES, Paris, was nominated. To replace Prof. CAGLIOTI, Prof. G. SARTORI, Rome, was nominated. Both were elected unanimously.

(2) Endorsement for sponsorship for Xth International Conference on Co-ordination Chemistry in Japan in 1967 without any financial commitments is given.

(3) Sponsorship is recommended for XIth International Conference on Co-ordination Chemistry in Israel 1968, provided that certain formal matters as requested by the Division shall be met by the Organizers, e.g. the US Air-Force Office of Scientific Research shall not be listed as a co-sponsoring organization, but rather as a financial supporter.

(4) Sponsorship is recommended to the 3rd International Conference on Organometallic Chemistry in München in 1967, which will not involve any financial contributions by IUPAC, provided that the report of IUPAC delegates to the 2nd Conference in Madison/Wisc. in September 1965 will be favorable.

(5) The request for sponsorship for a "Symposium on Crystal Chemistry of Transition Metal Compounds" in honour of Prof. ROLAND WARD was discussed. In view of the general policy that IUPAC should not be involved

in meetings in honour of scientists and in view of the short notice and lack of further information it was decided that no decision concerning recommendation for sponsorship could be made.

(6) The request for co-sponsorship for the 1st International Conference on Crystal Growth was discussed. Due to lack of information no recommendations were made. The President informed the meeting that the International Union for Crystallography had been asked to co-sponsor; the Union, however, decided not to sponsor the Symposium.

(7) The meeting was closed at 19.20 hours in good order.

Minutes of the Meeting of the Division Committee on Inorganic Chemistry, Paris

7 July, 1965, 14.00 hours

Present: Prof. J.H. DE BOER (President), Prof. J. BENARD (Vice-President), Prof. V. GUTMANN (Secretary), Prof. J.S. ANDERSON, Prof. O. GLEMSER, Prof. R.W. PARRY, Prof. B.J. TRZEBIATOWSKA.

Absent: Prof. G. SCHWARZENBACH, Prof. V.I. SPITZYN.

(1) The report of the Sub-Commission on Gaseous States was read, extensively discussed and finally the following resolution was reached: "The Sub-Commission did valuable work in bringing together those from all countries in the field of High Temperature Gases. Its present work, however, consists of bibliography and organization of symposia only which, valuable as it is, does not fall into the pattern laid down in the Statutes. Moreover its field of interest has been concerned with the Physical Chemistry and Chemical Physics of Plasma and lies outside the scope of the Division of Inorganic Chemistry. According to the request of the Sub-Commission the Division Committee therefore recommends that the Sub-Commission on Gases under the Division of Inorganic Chemistry be dissolved."

(2) The document prepared by Dr. GALLAY, Vice-President of the Division of Applied Chemistry, on "Communication among Branches of Pure Chemistry and between Pure and Applied Chemistry" was read and discussed. It was expressed that Dr. GALLAY and collaborators should be encouraged to indicate the scope and to provide the material for others to judge the value of the proposal, so that a commercial publishing house may become interested in due course. In any case it was felt that the problem raised in the document is not a problem for IUPAC only, but a problem for the whole of science and should perhaps be solved under the auspices of ICSU.

Minutes of the Meeting of the Division Committee and the Commission Chairmen, Paris

7 July, 1965, 15.00 hours

Present: Prof. J.H. DE BOER (President), Prof. J. BENARD (Vice-President), Prof. V. GUTMANN (Secretary), Prof. J.S. ANDERSON, Prof. O. GLEMSER, Prof. R.W. PARRY, Prof. B.J. TRZEBIATOWSKA, Dr. WICHERS (II, 1), Prof. K.A. JENSEN (II, 2), Prof. FLAHAUT (in place of Prof. NOWOTNY, II, 3,1), Prof. G. CHAUDRON (retiring Chairman of II, 3), and Prof. E. STARKMAN (Secretary of II, 3,2).

(1) The report of the Sub-Commission on Gaseous States was read and the resolution passed by the Division Committee was read to inform Dr.

STARKMAN, who expressed the hope that work can be continued in the Division of Physical Chemistry.

(2) The report of the Sub-Commission on Condensed States was read and discussed. It was agreed to recommend sponsorship for the symposium in Paris 1966 on Mechanism of Fusion and Crystallisation to be jointly organized by the Société française des Hautes Températures at de Réfractaires and by the Association belge pour l'étude des verres et des composés siliceux.

Further information was requested for the symposia proposed for 1967 and 1968.

The elections in this Commission were discussed but no action was taken in approving them. It was felt that 4 Titular Members should be sufficient to carry out the task of the Commission. It is hoped that after further discussion with the Commission Chairman, Prof. NOWOTNY, whose election was approved, a final understanding would soon be reached.

(3) The minutes of the Commission on Atomic Weights were approved.

(4) The minutes of the Commission on Nomenclature of Inorganic Compounds were approved including the re-election of all Members. Approval was given to a meeting of the full Commission in Switzerland 25–30 August, 1966. Money is also requested for one Observer from this Commission to attend the Meetings of the Commission on Nomenclature of Organic Compounds. These approvals by the Division Committee will be submitted to the Council for its agreement; only on the agreement of the Council can the decision take effect.

(5) It is recommended that all Commissions shall meet in Prague, 1967.

(6) Prof. PARRY suggests that consideration shall be given to the development of areas active in Inorganic Chemistry, where the Division may serve promoting such branches.

(7) The meeting was closed at 17.55 hours.

Report of the President of the Inorganic Division given in the Meeting of the Council in Gif-sur-Yvette, 6 July, 1965, afternoon

Since the last meeting of the Council the Division has been involved in a question which came up in connection with sponsorship. It was recommended and agreed by the Bureau that sponsorship should be given to the 9th International Conference on Co-ordination Chemistry, originally planned to be held in Zurich, 1966, afterwards changed to St. Moritz, 1966. The President and Secretary of the Division were asked by the Bureau to discuss with the organizers of this Conference the Alfred Werner Celebration connected with it. Afterwards the Executive Committee decided *not* to take part in the celebration and gave the ruling that IUPAC should not take part in memorial meetings.

The Division Committee met on Thursday, 1 July, 1965, in Paris. Two elections had to be made as Prof. H.J. EMELÉUS, the Past President, and Prof. V. CAGLIOTI have resigned as members of the Committee. Prof. R. COLLONGUES, Paris, and Prof. G. SARTORI, Rome, respectively, were elected unanimously in their places. It is hoped that Prof. COLLONGUES will be able to replace the present Secretary of the Division (Prof. GUTMANN), when he retires in 1967; as Prof. BENARD, Paris, will succeed me as a President in that same year, the situation will be created that the President and the Secretary of the Division are living in the same town, a situation

which will lead to a far more effective collaboration than is possible at present. I should like the Council to approve the membership of the Division Committee, including the two newly elected Members.

The Commission on Nomenclature of Inorganic Chemistry and the Commission on Atomic Weights may be considered, more or less, as permanent Commissions; they have permanent tasks to perform. Both these Commissions were continued, as such until 1965, by a decision of the Council in 1963 (page 156 of the Minutes of the London, 1963, Meeting) and I should like the Council to continue both now for a period of four years.

The Commission on High Temperatures and Refractories (two Sub-Commissions) has been headed up till now by Prof. CHAUDRON, who is going to resign. In the combined meeting of the Division Committee and the Chairmen of the Commissions, I thanked him warmly for all he has done for the Commission and I want to repeat my appreciation and that of the Division Committee at this place.

As the Sub-Commissions have not given their reports to me yet, I hope to come back on their future status at our Thursday meeting.

The Commission on Geochemistry has given us trouble for 12 years already. Many geochemists feel, apparently, not quite at home in the IUPAC, they require a sort of Geochemical Association. Although the final action has not been taken yet, I think the time has come to dissolve our Commission on Geochemistry and I should like the Council to act accordingly.

The Council may be informed that the Division Committee has to recommend sponsorship, without financial commitments for the Xth International Conference on Co-ordination Chemistry in Japan, 1967 and also for the XIth International Conference on Co-ordination Chemistry in Israel in 1968, the latter provided that certain formal matters, as requested by IUPAC, shall be met by the organizers. It has been recommended to consider a financial help, if needed, in the form of a guarantee up to $2000.— in the case of any deficit. This financial question may be decided, according to a Bureau decision, in 1966.

The Division Committee has also recommended sponsorship for the 3rd International Conference on Organometallic Chemistry in Munich, August 1967, provided that a favourable report be received by the IUPAC observers in Madison (Wisc.) at the 2nd Conference, in September of this year.

The Division Committee has decided not to recommend co-sponsorship for the 1st International Conference on Crystal Growth and also not to recommend sponsorship for a Symposium on Crystal Chemistry of Transition Metal Compounds.

Report of the President of the Inorganic Division given in the Meeting of the Council in Gif-sur-Yvette, 8 July, 1965

In continuation of my report of Tuesday I can now give a short review of the work of the Commissions.

The

II.1 Commission on Atomic Weights

recommends some small changes in the table of relative atomic weights 1965; they are:

Bromine	79.904	instead of	79.909
Silver	107.868	instead of	107.870
Copper	63.546	instead of	63.54

There are also some changes in the list of radioactive elements 1965; they concern 61 Promethium (Pm), 96 Curium (Cm), 97 Berkelium (Bk) and 99 Einsteinium (Es) and they relate to the half-life times of these elements. The Commission hopes to prepare a comprehensive report for the 1967 meetings.

The Division Committee recommends a continuation of this Commission for four years, as already stated in my Tuesday report. There is no change in the membership now but four Titular Members will have to be replaced in 1967.

Since the last Conference, the

II.2 Commission on Nomenclature

of Inorganic Chemistry had some meetings partly together with the Commission on the Nomenclature of Organic Chemistry. There has also been an extensive correspondence with experts in the fields of optically active co-ordination compounds and heteropolyacids. In the Paris Meeting of the present Conference the revision of the "Red Book" has caused much discussion. Among other things it was decided *not* to change *chloro* into *chlorido*.

The Commission presents the following documents to be published as tentative rules:

1 Nomenclature of Organo-metallic Compounds
2 Nomenclature of Co-ordination Compounds
3 Nomenclature of Addition Compounds
4 Nomenclature of Boron Compounds

The Division Committee recommends this publication.

The Commission asks for re-election of all its members for 4 years. The Division Committee realizes that the special and exacting character of the work which is now in progress may warrant this demand, and, therefore recommends this re-election of all members of the *Commission on Nomenclature of Inorganic Chemistry* to be granted. The Committee, however, has strongly recommended that the Commission take effective steps, after this period, to replace gradually various members, also in order to interest younger chemists in this work.

The Commission asks for permission to have a meeting of about 6 days in 1966 although this is not a Conference year. This meeting might take place in Switzerland at the end of August, 1966, because some members plan to attend the Conference on Co-ordination Chemistry in Zurich and St. Moritz. *The Division Committee* recommends this to be granted.

The Commission finally asks the recognition of the Observer from the Organic Commission in the Inorganic Commission and *vice versa* of its own Observer in the Organic Commission as Titular Members of both Commissions in so far as reimbursement of expenses is concerned. The Division Committee recommends this to be done.

The Division Committee of Inorganic Chemistry has asked me to draw the attention of the Council to the admirable work which both Commissions (Atomic Weights and Nomenclature) are performing. We may be really very thankful for all the work they perform and we should appreciate thankfully the time the members give for this work.

The Commission on Nomenclature of Inorganic Chemistry has further requested consideration of the formation of an

Inter-Divisional Committee on Nomenclature and Symbols

consisting of the chairmen of the Nomenclature Commissions from the Inorganic, Organic, Analytical, Physical and Biochemical Divisions with the aims of exchange of minutes, draft rules and documents concerned with systematic trival nomenclature, abbreviations and symbols in order to co-ordinate terminology in all branches of chemistry. Prof. JENSEN shall be the Convenor and Prof. BELCHER the recorder.

Of the two Sub-Commissions of the

II.3 Commission on High Temperatures and Refractories

the

II.3.1 Sub-Commission on Gases

has reviewed its work carefully. It consists of having prepared and distributed bibliographies on gases at high temperatures and it wants to extend this with a bibliography on the thermodynamics of plasma. A second activity concerns the organization of symposia. The Division Committee has drawn its attention to the fact that this work does not fall under the activities for which Commissions can be created. The statutes say that the object of Commissions is: *the study of topics of international scientific or technical significance requiring agreement, regularization, standardization or codification in some aspect of pure or applied chemistry.* The Division Committee, therefore, although appreciating the activities of the Sub-Commission, have come to the following statement:

"The Sub-Commission did valuable work in bringing together those from all countries in the field of High Temperature Gases. Its present work, however, consists of bibliography and organization of symposia only which, valuable as it is, does not fall into the pattern laid down in the statutes.

Moreover its field of interest has been concerned with physical chemistry and chemical physics of plasma and lies outside the scope of the Division of Inorganic Chemistry. According to the request of the Sub-Commission, the Division Committee therefore recommends that the Sub-Commission on Gases under the Division of Inorganic Chemistry be dissolved."

The other Sub-Commission of the Commission on High Temperatures and Refractories, the

II.3.2 Sub-Commission on Condensed States

asks for the sponsorship of three symposia. For two of those, to be held in 1967 and 1967 or 1968 respectively, the time limit of two years before the symposium may be accepted to be present and the Division Committee is prepared to examine those proposals and to collect sufficient information to prepare a suggestion to the Bureau. For one suggested symposium, to be held in July 1966, this period of two years in advance fails to be there. Nevertheless the Division Committee is prepared to discuss this in the next Bureau meeting.

The Sub-Commission has decided to continue the preparation and distribution of its bibliographies under the responsibility of Dr. DIAMOND of the National Bureau of Standards, Washington, and of Dr. FOEX of the Centre national de la Recherche scientifique, Paris.

The Sub-Commission wants to study new fixed points on a high temperature scale, starting from the melting point of aluminium to higher temperatures. They suggest a working group to be formed for this purpose.

The Commission on High Temperatures and Refractories as a whole, suggests the maintaining of the division of the Commission in two Sub-Commissions, one (Gas) to be attached to the Division on Physical Chemistry and the other (Condensed States) to the Inorganic Chemistry Division and they want to maintain the present membership of both Sub-Commissions.

The Division Committee cannot agree with this proposal and recommends (1) as already stated—the dissolution of the Sub-Commission on Gases, (2) the dissolution also of the Sub-Commission on Condensed States and (3) the non-acceptance of the suggestion to form a main Commission consisting of a Chairman, a Secretary, a Vice-Chairman, 5 Titular Members, 6 Associate Members and 7 National Representatives, but the entrusting of the high temperature work, as mentioned above, for two years to a *small commission on high temperatures and refractories* consisting of 4 members, in which H. Nowotny (Austria) is to be the Chairman, R. Collongues (France) is to be the Secretary, H. Flood (Norway) and W. Horton (USA) are to be Titular Members, with, probably, N.S.H. Bright (Canada), F. Cabannes (France), H. Schäfer (Germany), and R.S. Walker (USA) as Associate Members.

The actual work on the high temperature scale could then, as suggested be entrusted to a working group, consisting of Dr. Walker (USA) (Associated Member of the Commission), Motzfeldt (Norway); Riley (UK); Schneider (USA); Trombe, Foex, Urbain (France).

The Division Committee may ask the Council to consider this proposal.

There are two more points which the Division Committee has to bring forward,

(a) They suggest that a meeting be held of the President, Vice-President and Secretary of the Division Committee in 1966 in Vienna, probably in the late summer or autumn and taking 2 or 3 days, including travel.

(b) The Vice-President, Prof. Benard, is suggested to be designated as President Elect.

J.H. de Boer, President

Recommendations to the Bureau, Paris 1965

(1) That sponsorship be given for the 10th International Conference on Coordination Chemistry to be held in Japan, September 1967, without any financial commitments by IUPAC.

(2) That sponsorship be given for the 11th International Conference on Coordination Chemistry to be held in Israel in 1968, provided that certain formal matters as requested by IUPAC shall be met by the Organizers. The request for financial help up to $2000 if there happens to be a deficit (hence a guarantee sum), is supported.

(3) That sponsorship be given for the 3rd International Conference on Organometallic Chemistry in München, August 1967, provided that a favourable report be received by the IUPAC observers at the 2nd International Conference in Organometallic Chemistry in Madison 1965. No financial support is requested for this meeting.

(4) That sponsorship be given for the Symposium on Mechanism of Fusion and Crystallization in Paris 1966 although application was not made 2 years before the meeting.

(5) That the President, Vice-President and Secretary meet in Vienna in 1966 for 2 or 3 days.

(6) That the Commission on Nomenclature shall meet in Switzerland in 1966 and that the Observer to the meetings of the Commission on Nomenclature of Organic Chemistry be entitled to travel and subsistence allowances.

Recommendations to the Council in Paris 1965

(1) That membership of the Division of Inorganic Chemistry and the Chairmen of the Commissions be approved: Newly elected Titular Members of the Division Committee: Prof. R. Collongues, Paris, and Prof. G. Sartori, Rome; newly elected Chairman of the Commission on High Temperatures and Refractories: Prof. H. Nowotny, Vienna.

(2) That the Commissions on Atomic Weights and on Nomenclature of Inorganic Chemistry be continued for the period 1965–1969.

(3) That the Commission on Geochemistry be dissolved.

(4) That the Sub-Commission on Gaseous States be dissolved.

(5) That the Sub-Commission on Condensed States be dissolved and the Commission on High Temperatures and Refractories be continued for the period 1965–1967 (without Sub-Commissions) consisting of 4 Titular Members only, the elections of whom shall be approved by Council.

II.1 Commission on Atomic Weights

Report on the 1965 meetings

(1) The meetings were held on 2 and 3 July at the Conservatoire des Arts et Métiers, Paris. The following were present:

Titular Members: Dr. E. Wichers, Chairman, Dr. A.E. Cameron, Prof. N.N. Greenwood, Prof. J. Gueron, Prof. A. Ölander, Prof. H. Remy, Prof. H.G. Thode, Prof. A.H. Wapstra.

Associate Member: Dr. J. Spaepen.

Excused: Prof. T. Batuecas, Prof. J. Mattauch.

Dr. M.A. Paul attended the 2 July meeting.

(2) *1965 Tables*

Table of relative atomic weights 1965

The following changes were recommended:

Bromine	79.904[b]	instead of	79.909[b]
Silver	107.868[b]	instead of	107.870[b]
Copper	63.546[b]	instead of	63.54
Bromine	±0.001	instead of	0.002
Silver	±0.001	instead of	0.003
Copper	±0.001		

It was ascertained that these changes did not lead to any other changes.

The radioactive elements 1965

The following changes are recommended:

Atomic Number	Name	Symbol	Isotope 1965	Isotope 1963	Half Life 1965	Half Life 1963	Mode of Disintegration 1965	Mode of Disintegration 1963
61	Promethium	Pm	145	147	18 y	2.5 y	e.c.	β^-
96	Curium	Cm	247	247	$1.6 \cdot 10^7$ y	$4 \cdot 10^7$ y	α	α
97	Berkelium	Bk	247	247	1400 y	$\sim 10^4$ y	α	α
99	Einsteinium	Es	254	254	270 d	480 d	α	α

Table of selected relative atomic masses 1965

The Commission was informed that the computation by MATTAUCH et *al.* has just been updated and will become available in the very near future. It has been ascertained that the new values will involve no modification in the Table of Relative Atomic Weights.

The following changes are recommended:

Name	Mass Number	Relative Atomic Mass 1965	Relative Atomic Mass 1963
Tritium	3	3.016050	3.016049
Lithium	6	6.015125	6.015126
	7	7.016004	7.016005
Promethium	143	142.910	142.911
	145	144.913	144.912
Lead	204	203.9730	203.9731
Uranium	236	236.0456	236.0457
	238	238.0508	238.0507
Plutonium	240	240.0539	240.0540

(3) The Commission discussed the general problem of accuracy and of assessment of the confidence to be placed in the Tables.
It reviewed various reports made or sponsored by its members on this topic. It decided to continue this work, to which Dr. THODE will contribute by reviewing the natural variations in isotopic composition.
It is hoped that a comprehensive report might be prepared for the 1967 meetings, when additional high precision determinations on a number of elements are to be expected.
(4) There are no changes in membership at this date but four titular members will have to be replaced in 1967.

J. GUERON, Secretary

Table of Relative Atomic Weights 1965

BASED ON THE ATOMIC MASS OF $^{12}C = 12$

The values for atomic weights given in the Table apply to elements as they exist in nature, without artificial alteration of their isotopic composition, and, further, to natural mixtures that do not include isotopes of radiogenic origin.

The figures are the same as those of the 1961 Table except for copper, bromine, and silver. Element 103, Lawrencium, (symbol *Lr*) has been included.

Order of Atomic Number

Atomic Number	Name	Symbol	Atomic Weight	Atomic Number	Name	Symbol	Atomic Weight
1	Hydrogen	H	1.00797[a]	40	Zirconium	Zr	91.22
2	Helium	He	4.0026	41	Niobium	Nb	92.906
3	Lithium	Li	6.939	42	Molybdenum	Mo	95.94
4	Beryllium	Be	9.0122	43	Technetium	Tc	.....
5	Boron	B	10.811[a]	44	Ruthenium	Ru	101.07
6	Carbon	C	12.01115[a]	45	Rhodium	Rh	102.905
7	Nitrogen	N	14.0067	46	Palladium	Pd	106.4
8	Oxygen	O	15.9994[a]	47	Silver	Ag	107.868[b]
9	Fluorine	F	18.9984	48	Cadmium	Cd	112.40
10	Neon	Ne	20.183	49	Indium	In	114.82
11	Sodium	Na	22.9898	50	Tin	Sn	118.69
12	Magnesium	Mg	24.312	51	Antimony	Sb	121.75
13	Aluminium	Al	26.9815	52	Tellurium	Te	127.60
14	Silicon	Si	28.086[a]	53	Iodine	I	126.9044
15	Phosphorus	P	30.9738	54	Xenon	Xe	131.30
16	Sulfur	S	32.064[a]	55	Caesium	Cs	132.905
17	Chlorine	Cl	35.453[b]	56	Barium	Ba	137.34
18	Argon	Ar	39.948	57	Lanthanum	La	138.91
19	Potassium	K	39.102	58	Cerium	Ce	140.12
20	Calcium	Ca	40.08	59	Praseodym.	Pr	140.907
21	Scandium	Sc	44.956	60	Neodymium	Nd	144.24
22	Titanium	Ti	47.90	61	Promethium	Pm	.....
23	Vanadium	V	50.942	62	Samarium	Sm	150.35
24	Chromium	Cr	51.996[b]	63	Europium	Eu	151.96
25	Manganese	Mn	54.9380	64	Gadolinium	Gd	157.25
26	Iron	Fe	55.847[b]	65	Terbium	Tb	158.924
27	Cobalt	Co	58.9332	66	Dysprosium	Dy	162.50
28	Nickel	Ni	58.71	67	Holmium	Ho	164.930
29	Copper	Cu	63.546[b]	68	Erbium	Er	167.26
30	Zinc	Zn	65.37	69	Thulium	Tm	168.934
31	Gallium	Ga	69.72	70	Ytterbium	Yb	173.04
32	Germanium	Ge	72.59	71	Lutetium	Lu	174.97
33	Arsenic	As	74.9216	72	Hafnium	Hf	178.49
34	Selenium	Se	78.96	73	Tantalum	Ta	180.948
35	Bromine	Br	79.904[b]	74	Tungsten	W	183.85
36	Krypton	Kr	83.80	75	Rhenium	Re	186.2
37	Rubidium	Rb	85.47	76	Osmium	Os	190.2
38	Strontium	Sr	87.62	77	Iridium	Ir	192.2
39	Yttrium	Y	88.905	78	Platinum	Pt	195.09

Atomic Number	Name	Symbol	Atomic Weight	Atomic Number	Name	Symbol	Atomic Weight
79	Gold	Au	196.967	92	Uranium	U	238.03
80	Mercury	Hg	200.59	93	Neptunium	Np	.....
81	Thallium	Tl	204.37	94	Plutonium	Pu	.....
82	Lead	Pb	207.19	95	Americium	Am	.....
83	Bismuth	Bi	208.980	96	Curium	Cm	.....
84	Polonium	Po	.....	97	Berkelium	Bk	.....
85	Astatine	At	.....	98	Californium	Cf	.....
86	Radon	Rn	.....	99	Einsteinium	Es	.....
87	Francium	Fr	.....	100	Fermium	Fm	.....
88	Radium	Ra	.....	101	Mendelevium	Md	.....
89	Actinium	Ac	.....	102	Nobelium	No	.....
90	Thorium	Th	232.038	103	Lawrencium	Lr	.....
91	Protactinium	Pa	.....				

[a] Atomic weights so designated are known to be variable because of natural variations in isotopic composition. The observed ranges are:

Hydrogen	±	0.00001	Oxygen	±	0.0001
Boron	±	0.003	Silicon	±	0.001
Carbon	±	0.00005	Sulfur	±	0.003

[b] Atomic weights so designated are believed to have the following experimental uncertainties:

Chlorine	±	0.001	Copper	±	0.001
Chromium	±	0.001	Bromine	±	0.001
Iron	±	0.003	Silver	±	0.001

Table of Relative Atomic Weights 1965

BASED ON THE ATOMIC MASS OF $^{12}C = 12$

The values for atomic weights given in the Table apply to elements as they exist in nature, without artificial alteration of their isotopic composition, and, further to natural mixtures that do not include isotopes of radiogenic origin.

The figures are the same as those of the 1961 Table except for bromine, copper, and silver. Element 103, Lawrencium, (symbol *Lr*) has been included.

Alphabetical Order in English

Name	Symbol	Atomic Number	Atomic Weight	Name	Symbol	Atomic Number	Atomic Weight
Actinium	Ac	89	.....	Indium	In	49	114.82
Aluminium	Al	13	26.9815	Iodine	I	53	126.9044
Americium	Am	95	.....	Iridium	Ir	77	192.2
Antimony	Sb	51	121.75	Iron	Fe	26	55.847[b]
Argon	Ar	18	39.948	Krypton	Kr	36	83.80
Arsenic	As	33	74.9216	Lanthanum	La	57	138.91
Astatine	At	85	.....	Lawrencium	Lr	103	.....
Barium	Ba	56	137.34	Lead	Pb	82	207.19
Berkelium	Bk	97	.....	Lithium	Li	3	6.939
Beryllium	Be	4	9.0122	Lutetium	Lu	71	174.97
Bismuth	Bi	83	208.980	Magnesium	Mg	12	24.312
Boron	B	5	10.811[a]	Manganese	Mn	25	54.9380
Bromine	Br	35	79.904[b]	Mendelevium	Md	101	.....
Cadmium	Cd	48	112.40	Mercury	Hg	80	200.59
Caesium	Cs	55	132.905	Molybdenum	Mo	42	95.94
Calcium	Ca	20	40.08	Neodymium	Nd	60	144.24
Californium	Cf	98	.....	Neon	Ne	10	20.183
Carbon	C	6	12.01115[a]	Neptunium	Np	93	.....
Cerium	Ce	58	140.12	Nickel	Ni	28	58.71
Chlorine	Cl	17	35.453[b]	Niobium	Nb	41	92.906
Chromium	Cr	24	51.996[b]	Nitrogen	N	7	14.0067
Cobalt	Co	27	58.9332	Nobelium	No	102	.....
Copper	Cu	29	63.546[b]	Osmium	Os	76	190.2
Curium	Cm	96	.....	Oxygen	O	8	15.9994[a]
Dysprosium	Dy	66	162.50	Palladium	Pd	46	106.4
Einsteinium	Es	99	.....	Phosphorus	P	15	30.9738
Erbium	Er	68	167.26	Platinum	Pt	78	195.09
Europium	Eu	63	151.96	Plutonium	Pu	94	.....
Fermium	Fm	100	.....	Polonium	Po	84	.....
Fluorine	F	9	18.9984	Potassium	K	19	39.102
Francium	Fr	87	.....	Praseodym.	Pr	59	140.907
Gadolinium	Gd	64	157.25	Promethium	Pm	61	.....
Gallium	Ga	31	69.72	Protactinium	Pa	91	.....
Germanium	Ge	32	72.59	Radium	Ra	88	.....
Gold	Au	79	196.967	Radon	Rn	86	.....
Hafnium	Hf	72	178.49	Rhenium	Re	75	186.2
Helium	He	2	4.0026	Rhodium	Rh	45	102.905
Holmium	Ho	67	164.930	Rubidium	Rb	37	85.47
Hydrogen	H	1	1.00797[a]	Ruthenium	Ru	44	101.07

Name	Symbol	Atomic Number	Atomic Weight	Name	Symbol	Atomic Number	Atomic Weight
Samarium	Sm	62	150.35	Thorium	Th	90	232.038
Scandium	Sc	21	44.956	Thulium	Tm	69	168.934
Selenium	Se	34	78.96	Tin	Sn	50	118.69
Silicon	Si	14	28.086[a]	Titanium	Ti	22	47.90
Silver	Ag	47	107.868[b]	Tungsten	W	74	183.85
Sodium	Na	11	22.9898	Uranium	U	92	238.03
Strontium	Sr	38	87.62	Vanadium	V	23	50.942
Sulfur	S	16	32.064[a]	Xenon	Xe	54	131.30
Tantalum	Ta	73	180.948	Ytterbium	Yb	70	173.04
Technetium	Tc	43	.....	Yttrium	Y	39	88.905
Tellurium	Te	52	127.60	Zinc	Zn	30	65.37
Terbium	Tb	65	158.924	Zirconium	Zr	40	91.22
Thallium	Tl	81	204.37				

[a] Atomic weights so designated are known to be variable because of natural variations in isotopic composition. The observed ranges are:

Boron	± 0.003	Oxygen	± 0.0001
Carbon	± 0.00005	Silicon	± 0.001
Hydrogen	± 0.00001	Sulfur	± 0.003

[b] Atomic weights so designated are believed to have the following experimental uncertainties:

Bromine	± 0.001	Copper	± 0.001
Chlorine	± 0.001	Iron	± 0.003
Chromium	± 0.001	Silver	± 0.001

The Radioactive Elements 1965

Order of Atomic Number

Atomic Number	Name	Symbol	Isotope	Half Life	Mode of Disintegration
43	Technetium	Tc	99	2.1×10^5y	β^-
61	Promethium	Pm	145	18y	e.c.
84	Polonium	Po	210	138.4 d	α
85	Astatine	At	210	8.3 h	α, e.c.
86	Radon	Rn	222	3.83 d	α
87	Francium	Fr	223	22 m	α, β^-
88	Radium	Ra	226	1622 y	α
89	Actinium	Ac	227	22 y	α, β^-
90	Thorium	Th	232	1.4×10^{10} y	α
91	Protactinium	Pa	231	3.2×10^4 y	α
92	Uranium	U	238	4.5×10^9 y	α
93	Neptunium	Np	237	2.1×10^6 y	α
94	Plutonium	Pu	242	3.8×10^5 y	α
95	Americium	Am	243	7.8×10^3 y	α
96	Curium	Cm	247	1.6×10^7 y	α
97	Berkelium	Bk	247	1400	α
98	Californium	Cf	249	360 y	α
99	Einsteinium	Es	254	270 d	α
100	Fermium	Fm	253	3 d	e.c. α
101	Mendelevium	Md	256	ca. 1.5 h	e.c.
102	(Nobelium)	No	256	$\sim$8 s	α, fission
103	Lawrencium	Lr	257(?)	8 s	α

This table lists selected isotopes of the chemical elements, whether occurring in nature or known only through synthesis, that are commonly classed as radioactive. The listed isotope is the one of longest known half-life.

Table of Selected Relative Atomic Masses 1965

The number of current chemical operations performed on natural or artificial radioactive elements, medium lived radioactive elements, and on usual elements of unusual isotopic composition makes it often necessary to compute, from the atomic masses of individual isotopes and the isotopic abundances, what might be called the "effective relative atomic weight" of the actual product which is being handled.

This is why a separate "Table of Selected Relative Atomic Masses" will be, from now on, added to the traditional Table of Relative Atomic Weights and Table of Radioactive Elements. The relevant figures taken from the coherent recomputation of König, Mattauch and Wapstra (in press) are good to ±1 of the last decimal.

Name	Symbol	Atomic Number	Mass Number	Relative Atomic Mass
Hydrogen	H	1	1	1.007825
Deuterium	D	1	2	2.014102
Tritium	T	1	3	3.016050
Lithium	Li	3	6	6.015125
		3	7	7.016004
Boron	B	5	10	10.012939
		5	11	11.009305
Carbon	C	6	12	12.000000
		6	13	13.003354
Nitrogen	N	7	14	14.003074
		7	15	15.000108
Oxygen	O	8	16	15.994915
		8	17	16.999133
		8	18	17.999160
Technetium	Tc	43	99	98.906
Promethium	Pm	61	143	142.910
			145	144.913
			147	146.915
Lead	Pb	82	204	203.9730
			206	205.9745
			207	206.9759
			208	207.9767
Radium	Ra	88	226	226.0254
Uranium	U	92	233	233.0395
			234	234.0409
			235	235.0439
			236	236.0456
			238	238.0508
Neptunium	Np	93	237	237.0480
Plutonium	Pu	94	239	239.0521
			240	240.0539
			241	241.0567
			242	242.0587

II.2 Commission on the Nomenclature of Inorganic Chemistry

Paris, 30 June—5 July, 1965.

President: K.A. JENSEN (in the Chair), J. CHATT, E.J. CRANE, G.H. CHEESMAN, W.C. FERNELIUS, L. MALATESTA, A. ÖLANDER, H. REMY, F. GALLAIS and J.E. PRUE, Secretaries, Y.P. JEANIN (by invitation as a deputy for F. GALLAIS).
The Commission stood in silence as a mark of respect for its former President, the late Professor H. BASSETT.

An apology for absence was received from Associate Member A. KOTOWSKI.

65/1 *Organometallic Compounds*. The document (November 1964) which had been circulated to members was slightly amended to take account of the comments of the President of the Organic Nomenclature Commission and then approved for publication as tentative rules, subject to any further changes required by decisions taken at a later stage of the meeting.

65/2 *Revision of 1957 Rules (Red Book)*. The Commission considered a list of proposed revisions prepared in accordance with minute 64/12 and reviewed by the Sub-Commission appointed under minute 64/8. The document (July 1965) attached to these minutes sets out the changes which were agreed. These will be incorporated in the revised rules to be published after tentative rules for organometallic compounds, co-ordination compounds, addition compounds, and boron compounds have received approval.

During its discussions the Commission reaffirmed the definition of a transition element in minute 65/8, its view that ionic charge should be indicated by A^{n+} rather than by A^{+n}, and its preference for the prefix *catena* to indicate chain structures. It noted that if negatively charged complexes of radon are eventually prepared, the adoption of the name "radates" for these could lead to confusion. In connection with rule 2.251 the Commission noted that the Organic Nomenclature Rules broke the list of Greek numerical prefixes by the Latin nona and undeca; it was agreed that in this respect no change should be made now in rule 2.251, although it might be preferable to use Arabic numerals for these cases. It was thought that a general rule about the -ane termination for hydrides would be best considered in the context of Section I (hydrides and their derivatives) of the document on the nomenclature of inorganic chain and ring compounds. In connection with rule 5.35 the Commission noted the development of nomenclature problems concerning phosphonitrilic compounds. It was agreed to give further consideration to the sections dealing with isopolyanions and heteropolyanions when detailed comments had been received from Professor L.C.W. BAKER. It was noted that topochemical nomenclature problems might be relevant to the work of the Sub-Commission appointed under minute 63/15, and W.C. FERNELIUS agreed to suggest an appropriate person for consultation. K.A. JENSEN agreed to ask the editor of Acta Crystallographica for comment on the chapter dealing with polymorphism.

65/3 *Co-ordination Compounds*. The Commission considered draft tentative rules for co-ordination compounds (May 1965) prepared by the Sub-Commission appointed under minute 64/8. It was agreed that (1) ligands be cited in alphabetical order without previous division into classes, (2) there was no case for the segregation of bridging groups in the sequence, and (3) the PASTERNACK-McDONNELL system be adopted for the assignment of locant designators. In applying the PASTERNACK-McDONNELL system it was further agreed that in the tentative rules lower case letters be used as locant designators, the first ligand mentioned in the name being given

position (a), with the addition if necessary of a class symbol after the name to indicate the geometrical configuration around the co-ordination centre.

That part of minute 63/5 which proposed the abandonment of abbreviated names of anionic ligands in 5.22 and 7.312 was rescinded. Notwithstanding some objections the Commission resolved to substitute "aqua" for "aquo" as the name for the ligand H_2O.

W.C. FERNELIUS agreed to prepare a revised version of the draft rules for publication as tentative rules.

65/4 *Optically Active Complexes.* With reference to minute 64/7 the Commission noted that a wide variety of opinions had been received dealing with a notation for the absolute configuration of optically active complexes. It was clear that a joint Sub-Commission with the Organic Nomenclature Commission was necessary to deal with the matter on a wide basis. It was resolved to invite B.E. DOUGLAS and A.M. SARGESON together with K.A. JENSEN to represent the Commission on such a Sub-Commission. K.A. JENSEN was asked to ensure that crystallographers were consulted.

65/5 *Inorganic Chain and Ring Compounds.* The Commission discussed a document (June 1965) prepared by K.A. JENSEN, the first section of which dealt with hydrides and their derivatives and the second with polyanions.

With regard to Section I, the views of the Commission were as follows: (1) The prefix *carba-* should not be employed even if carbon is not the preponderant element in the chain or ring, (2) examples containing radicals with the "-io" ending should be introduced, (3) the numbering system needed careful attention and (4) difficult problems arose concerning consistency and overlap with organic nomenclature rules (e.g. for carboxylic acids) and co-ordination chemistry nomenclature. There was also a general discussion concerning the systematic naming of hydrides. After some amendments it was agreed that Section I should be sent to the Organic Nomenclature Commission in order that they could give further guidance to the joint Sub-Commission.

Section II was referred back to the inorganic members of the joint Sub-Commission (J. CHATT, K.A. JENSEN, L. MALATESTA) who were asked to give particular attention to the relationship between the proposed system of nomenclature and one based on co-ordination compound nomenclature. These members were also asked to take account of the memoranda on nomenclature for the oxoacids of phosphorus submitted on behalf of German chemists by H. REMY.

65/6 *Boron Compounds.* A document prepared by K.A. JENSEN was, after amendment, approved for publication as tentative rules. The Commission noted that difficulty might arise in distinguishing chloro- and clovo-. The possibility of adopting the prefix soro- in place of clovo- was considered and W.C. FERNELIUS undertook to ascertain USA opinion on this matter. It was agreed that W.C. FERNELIUS and K.A. JENSEN should constitute a Sub-Commission with power to co-opt for the purpose of further discussion of the tentative rules with the USA boron chemistry group. The Commission recognized that rules would also be needed for such species as addition compounds containing boron, organic boron compounds and boron oxoacids.

65/7 *Organic Compounds of Phosphorus and Arsenic.* Preliminary consideration was given to a document (June 1965) prepared by K.A. JENSEN. There was an inconclusive discussion concerning names for the various hypothetical oxyacids of compositions H_3PO_2 and H_3PO_3. The general views of the Commission were that (1) as far as possible the same rules should be used for the nomenclature of compounds containing P(III) and

P(V), (2) in any document a proposed nomenclature system should be illustrated for all quoted compounds, (3) in the case of P(V) compounds in sections A.2.1 and A.2.2 method (a) which was an organometallic type of nomenclature seemed generally applicable and was favoured, whilst in the same context method (b) on p. 7 was not approved and method (c) on p. 9 was likewise disapproved.

65/8 *Membership.* The Chairman said that as the Commission had so much work at an interim stage, he thought that it would be undesirable to change the composition of the Commission at the present juncture. He therefore proposed to ask for the reappointment of the whole Commission, for a four-year term if possible; E.J. CRANE indicated that he thought it unlikely that he would wish to continue his membership for more than two further years.

65/9 *Next Meeting.* It was agreed that if possible a meeting in 1966 was desirable. A meeting in Switzerland from 25–30 August would be suitable.

Revision of the 1957 Rules (Red Book)

1.11 Enter in table: Lawrencium Lr 103. Footnote to last sentence: The isotopes ^{2}H and ^{3}H are named deuterium and tritium and the symbols D and T respectively may be used (see Rule 1.15).

1.15 All isotopes of an element except hydrogen should bear the same name. For hydrogen the isotope names protium, deuterium and tritium with the symbols ^{1}H, ^{2}H or D, and ^{3}H or T respectively are used. The prefixes deuterio- and tritio- are used when protium has been replaced. It is undesirable to assign isotopic names instead of numbers to other elements. They should be designated by mass numbers as, for example, "oxygen-18", with the symbol ^{18}O (see Rule 1.31).

1.21 The use of the collective names: halogens (F, Cl, Br, I and At), chalcogens (O, S, Se, Te, and Po), and halogenides (or halides) and chalcogenides for their compounds, alkali metals (Li to Fr), alkaline-earth metals (Ca to Ra), and noble gases may be continued. The name rare-earth metals may be used for the elements Sc, Y, and La to Lu inclusive. The name lanthanoids for the elements 57–71 (La to Lu inclusive) is recommended; the names actinoids, uranoids, and curoids should be used analogously.

A transition element is an element whose atoms has an incomplete *d* sub-shell, or which gives rise to a cation or cations with an incompleted *d* sub-shell.

When it is desired to designate sub-groups of the elements by the capital letters A and B these should be used as follows:

1A	2A	3A	4A	5A	6A	7A
K	Ca	Sc	Ti	V	Cr	Mn
Rb	Sr	Y	Zr	Nb	Mo	Tc
Cs	Ba	La*	Hf	Ta	W	Re
Fr	Ra	Ac**	[Th]	[Pa]	[U]	
1B	2B	3B	4B	5B	6B	7B
Cu	Zn	Ga	Ge	As	Se	Br
Ag	Cd	In	Sn	Sb	Te	I
Au	Hg	Tl	Pb	Bi	Po	At

* Including the lanthanoids

** Including the actinoids, but thorium, protactinium and uranium may also be placed in groups 4, 5 and 6, as indicated in square brackets.

1.22 Because of the inconsistent uses in different languages of the word metalloid its use should be abandoned.

Elements should be classified as metallic, semi-metallic and non-metallic.

1.32 *Italicise* symbols of labelled elements and their superscripts throughout, e.g. $^{32}PCl_3$ phosphorus (^{32}P) trichloride (spoken: phosphorus -32 trichloride).

2.16 *Delete* N_4S_4 from examples.

2.17 *Change* 103 to Lr.

2.19 The prefixes which may be used are listed in a table. The prefixes should be connected with the formula by a hyphen and be italicised.

Example: *cis*-$[PtCl_2(NH_3)_2]$

Note The table referred to is at present in the tentative rules for co-ordination compounds.

2.22 *Delete* nitrogen sulfide from examples.

2.24 *Change* to disodium tetraoxosulfate, etc. in examples.

Incorporate in table for 1.12 or in separate table a list of modified names of elements to precede -ate.

2.251 *Second* paragraph: The prefix mono- may be omitted except where confusion would arise. This is especially so in the case of certain ternary compounds where otherwise the extent of replacement of oxygen by some other element might be uncertain, e.g. CSO_2^{2-}, monothiocarbonate. Beyond 12, Greek prefixes are replaced by Arabic numerals (with or without hyphen according to the custom of the language), as they are more readily understood. The end-vowels of numerical prefixes should not be elided except for compelling linguistic reasons.

End of *fourth* paragraph to read: and the whole group to which they refer is placed in parentheses.

2.252 The proportions of the constituents may also be indicated indirectly either by STOCK's system or by the EWENS-BASSETT system.

In STOCK's system the oxidation number of an element is indicated by a Roman numeral placed in parentheses immediately following the name of the element. For zero the Arabic 0 is used. When used in conjunction with symbols the Roman numeral may be placed above and to the right.

The STOCK notation can also be applied to cations and anions. In employing it, use of the Latin names of the elements (or Latin roots) is considered advantageous.

Examples:

$FeCl_2$	iron(II) chloride or ferrum(II) chloride
$FeCl_3$	iron(III) chloride or ferrum(III) chloride
MnO_2	manganese(IV) oxide
BaO_2	barium(II) peroxide
P_2O_5	phosphorus(V) oxide or diphosphorus pentoxide
As_2O_3	arsenic(III) oxide or diarsenic trioxide
$Pb_2^{II}Pb^{IV}O_4$	dilead(II) lead(IV) oxide or trilead tetraoxide
$K_4[Ni(CN)_4]$	potassium tetracyanoniccolate(0)
$K_4[Fe(CN)_6]$	potassium hexacyanoferrate(II)
$Na_2[Fe(CO)_4]$	sodium tetracarbonylferrate(II)

In the EWENS-BASSETT system the charge of an ion indicated by an Arabic numeral followed by the sign of the charge is placed in parentheses immediately following the name of the ion.

Examples:

$K_4[Ni(CN)_4]$	potassium tetracyanoniccolate(4–)
$K_4[Fe(CN)_6]$	potassium hexacyanoferrate(4–)
$Na_2[Fe(CO)_4]$	sodium tetracarbonylferrate(2–)
$Na_2N_2O_2$	sodium dioxodinitrate(2–)
UO_2SO_4	uranyl(2+) sulfate
$(UO_2)_2SO_4$	uranyl(1+) sulfate
$KReO_4$	potassium rhenate(1–)

2.253 *Change* "not recommended" to "discouraged".

2.26 *Delete* final three examples

2.3 Change table and following paragraph as follows:

B_2H_6	diborane		
SiH_4	silane	Si_2H_6	disilane, etc.
PH_3	phosphane		
AsH_3	arsane		
SbH_3	stibane		
BiH_3	bismuthane		

The ending -ine is not recommended, and should particularly be avoided in naming the hydrides of elements not in group 5. In view of their long usage the names phosphine, arsine, stibine and bismuthine are allowed for the substances PH_3, AsH_3, SbH_3, and BiH_3. In some languages names of the type "Chlorwasserstoff" are in use and may be retained if national nomenclature committees so wish.

3.11 *Change* to:

I^+ the iodine(I) cation.

3.14 *Add* at end of first sentence: (for nitrogen see 3.15).
Delete sentence concerning "hydronium" in *third* paragraph and "however" in following sentence.

3.221 *Change* sentence following list of ions to read:
Names for other polysulfide, polyhalogenide and like ions containing a single element only may be formed in analogous manner.

3.224 *Remove* "pyrophosphate" and "pyrosulfate".

3.32 *Change* first paragraph to read:
Certain neutral and cationic radicals (for anions see 3.22) containing oxygen or other chalcogens have, irrespective of charge, special names ending in -yl, and the Commission approves the provisional retention of the following:

Delete VO vanadyl and *substitute* disulfuryl for pyrosulfuryl in list on p. 32.

Delete first sentence at top of p. 34.

Change fourth paragraph to read: In cases where the characteristic element of a radical may have different oxidation numbers these should be indicated by the STOCK notation; when the radical is an ion its charge may be indicated by the EWENS-BASSETT system. For example, the ions UO_2^{2+} and UO_2^+ can be named as uranyl(VI) and uranyl(V) or as uranyl(2+) and uranyl(1+) respectively.

Change examples on p. 34 as follows:

Delete POCl phosphoryl(III) chloride.

Change to:

S_2O_5ClF	disulfuryl chloride fluoride
$SO_2(N_3)_2$	sulfonyl (sulfuryl) diazide
SO_2NH	sulfonyl (sulfuryl) imide

3.33 *Delete* "preferably" in second line at top of p. 36.

Change examples as follows:

HSO_3F	fluorosulfuric acid
HSO_3Cl	chlorosulfuric acid
NH_2SO_3H	amidodisulfuric acid
$NH(SO_3H)_2$	imidobissulfuric acid
$N(SO_3H)_3$	nitridotrissulfuric acid

Change last paragraph to read:
Another organic type of nomenclature (cf. Rules for the Nomenclature of Organic Chemistry, 1965, p. 44, Section C-0.5), the formation of "conjunctive names", . . .

5.211 *Delete* $H_4B_2O_4$ hypoboric acid.

5.213 *Change* final sentence to read: The trivial name pyrophosphoric acid may be retained for $H_4P_2O_7$, although diphosphoric acid is preferable.

5.214 *Change* first example to read:

H_2MnO_4	tetraoxomanganic(VI) acid, to distinguish it from H_3MnO_4, tetraoxomanganic(V) acid.

Delete H_2NO_2 dioxonitric(II) acid instead of nitroxylic acid.
In table on p. 48: *Delete* $H_4B_2O_4$ hypoboric acid and *delete* brackets around "ortho" in cases of H_6TeO_6 and H_5IO_6.
Change final paragraph to read: The names gallic(III) acid, germanic acid, stannic acid, antimonic acid, bismuthic acid, vanadic acid, niobic acid, tantalic acid, telluric acid, molybdic acid, wolframic acid, and uranic acid may be used for substances with indefinite "water content" and degree of polymerization. The inclusion of the STOCK number in the case of gallic(III) acid serves to distinguish it from the organic acid.

5.3 Functional derivatives of acids are compounds formed from acids by substitution of OH and sometimes also O by other groups. In this field functional nomenclature is still used but is not recommended.

5.31 *Replace* sulfuryl by nitrosyl.

6.2 *Delete* second paragraph
Insert KHS potassium hydrogensulfide in examples.

6.321 The cations other than hydrogen (cf. 6.2 and 6.324) are to be cited in alphabetical order.

6.322 *Delete.*

6.323 *Hydration of cations.* Owing to the prevalence of hydrated cations, many of which are in reality complex, it is unnecessary to disturb the cation order to allow for this. If it is necessary to draw attention specifically to the presence of a particular hydrated cation this is treated as a complex ion, e.g. hexaaquazinc, and takes its place in the alphabetical sequence.

6.324 *Acidic hydrogen.* Hydrogen is cited last among the cations (*delete* remainder of paragraph).

Examples:

$KMgF_3$	*m*agnesium *p*otassium fluoride
$TlNa(NO_3)_2$	*s*odium *t*hallium(I) nitrate or *s*odium *t*hallium dinitrate
$KNaCO_3$	*p*otassium *s*odium carbonate
$NH_4MgPO_4 \cdot 6H_2O$	*a*mmonium *m*agnesium phosphate hexahydrate
$NaZn(UO_2)_3(C_2H_3O_2)_9 \cdot 6H_2O$	*s*odium tri*u*ranyl(VI) zinc acetate hexahydrate
$Na[Zn(H_2O)_6](UO_2)_3(C_2H_3O_2)_9$	hexa*a*quazinc *s*odium triuranyl (VI) acetate
$NaNH_4HPO_4 \cdot 4H_2O$	*a*mmonium *s*odium hydrogenphosphate tetrahydrate

6.331 Anions are to be cited in alphabetical order.

6.332 *Delete.*

6.333 *Delete.*

6.34 The stoicheiometric method is used for indicating the proportions of constituents if necessary.

6.51 In the double oxides and hydroxides the metals are cited in alphabetical order.

7.5 and 7.6 Agreed that these sections should follow chapter 3 as chapter 4. The present chapter 4 will have to be shifted.

7.7 A revised version of this was approved for publication as a tentative rule 8. A cross-reference to non-stoicheiometric compounds will eventually be desirable.

List of names for ions and radicals.

p. 88 p. *Delete* keto and thiol. Insert dioxygenyl for O_2^+. *Change* footnote to read: "If necessary oxidation state of element to be given by STOCK notation, or charge on ion by EWENS-BASSETT system."

p. 90 *Delete* $(NS)_n$ ·

pp. 90 and 91. *Change* footnote.

Other revisions in the table may well be necessary.

The Commission agreed that any other tables which were relevant to several rules should be numbered and placed together at the end of the book.

The revised rules will be provided with an index.

National representatives are asked to note that it is undesirable to change the numbering of a rule even if a preceding one has disappeared in the translation.

II.3 Commission des Hautes Températures et Réfractaires

II.3.1 Sous-Commission des Etats condensés

La Sous-Commission des Etats condensés de la Commission des Hautes Températures de l'Union Internationale de Chimie s'est réunie au Conservatoire National des Arts et Métiers à Paris, le 2 juillet à 14 h, puis le 3 juillet à 9 h. La deuxième de ces réunions étant commune à l'ensemble de la Commission.

Assistaient à ces réunions:

Prof. G. Chaudron (France), Président de la Commission des Hautes Températures.

Membres titulaires: Prof. H. Nowotny (Autriche). Prof. F. Trombe (France), Prof. H. Flood (Norvège).

Dr M. Foex, (France), Secrétaire de la Sous-Commissions des Etats condensés.

Membres associés: Dr N.F.H. Bright, (Canada), Dr J.J. Diamond, (Etats-Unis), Dr R.F. Walker, (Etats-Unis).

Membres observateurs: Prof. C. De Maria (Italie), Prof. R. Collongues (France), Prof. J. Flahaut (France), Dr W.S. Horton (Etats-Unis), Dr F. Cabannes (France).

1° Le Professeur G. Chaudron indique tout d'abord à la Sous-Commission, les résultats de la Conférence des Présidents de la Division de Chimie minérale. La question de la transformation des deux Sous-Commissions de Gaz et des Etats condensés en deux Commissions indépendantes y a été évoquée. Il ne semble pas possible d'envisager actuellement la création au sein de la Division de Chimie minérale, d'une nouvelle Commission spécialisée dans le domaine des Hautes Températures.

2° La Sous-Commission accorde son patronage aux différents symposiums et colloques suivants:

a) Symposium sur la Technologie des Hautes Températures, faisant suite aux deux symposiums sur ce sujet qui se sont tenus à Asilomar (Californie) en 1959 et 1963. Ce symposium organisé par le Stanford Research Institute (Californie), en liaison avec le Dr R.F. Walker (National Bureau of Standards, Washington), aurait lieu en 1967, dans une ville de l'est des Etats-Unis.

b) Colloque sur le Mécanisme de la Fusion et de la Cristallisation, à Paris, en juillet 1966, sous le patronage de la Société française des Hautes Températures (Président: M. le Prof. G. Chaudron), et de l'Association Belge pour l'Etude des Verres. Le Prof. R. Collongues s'occupera de son organisation.

c) Symposium sur les Matériaux à Haute Température, organisé à Vienne en 1967 ou 1968, par le Prof. H. Nowotny.

3° La question de l'établissement de listes de références bibliographiques est ensuite abordée. De nouveaux correspondants ont été trouvés à ce sujet; il s'agit du Dr Jan Hlaváč et du Dr Jos Koritta, de l'Université de Chimie Technologique, à Prague (Tchécoslovaquie), du Dr Jan Niemiec, de l'Université Technique de Wroclaw (Pologne), du Dr M.H. Dewar de Morganite Research Development Inc., en Angleterre, qui a remplacé les Drs K.G. McWhirter et G.L. Kington.

La Sous-Commission décide d'introduire une nouvelle rubrique concernant «L'état liquide» au-dessus de 1000 °C, avec comme indice de classification la lettre I.

Le Dr J.J. Diamond indique que la bibliographie anglaise du National Bureau of Standards est tirée à 1950 exemplaires. 1320 copies sont distribuées aux Etats-Unis, 200 au Canada, 155 au Royaume-Uni, 50 en Australie, 50 au Japon, 25 en Hollande, 16 aux Pays Scandinaves, 10 en Tchécoslovaquie, 10 aux Indes, 10 en Italie.

La bibliographie établie à Montlouis (France) est tirée actuellement à 600 exemplaires, et distribuée comme suit: 100 copies en France, 50 copies en Allemagne, 50 copies en Angleterre, 50 copies en Scandinavie, 50 en URSS, 50 au Japon, 50 en Italie, 30 en Autriche, 30 aux Pays-Bas, 25 aux

Indes, 20 en Argentine, 15 en Belgique, 15 au Brésil, 10 en Espagne, 5 en Australie, 5 au Chili et 5 en Grèce.

Un avis favorable à la poursuite de l'établissement de ces bibliographies est donné.

4° La Sous-Commission décide de continuer à patronner l'établissement de tables de constantes. Le travail très intéressant entrepris à ce sujet, en France, par le Prof. TROMBE, mérite d'être encouragé. Ces tables seront éditées par la Commission des Tables de Constantes française, dirigée par Mme ALLARD, laquelle était affiliée à l'Union Internationale de Chimie Pure et Appliquée. En outre, M. TROMBE a commencé la publication, dans la Revue française des Hautes Températures, de tables périodiques donnant les tensions de vapeur des éléments.

5° Les questions de «standards» retiennent particulièrement l'attention de la Commission. Le Dr R.F. WALKER donne quelques précisions au sujet de la réunion qui s'est tenue à Paris la veille, 1er juillet, et qui a groupé des spécialistes de nombreux pays. Cette réunion a été consacrée à la recherche d'étalons secondaires de points de fusion à hautes températures, domaine où presque tout reste à faire. Les spécialistes ont décidé pour commencer, de centrer leurs efforts sur la détermination du point de fusion de l'alumine; les méthodes utilisables pour cela ont été comparées: de plus il a été demandé à MM. F. TROMBE et M. FOEX de préparer une quantité importante d'alumine pure fondue au four solaire, afin de pouvoir effectuer tous les essais avec le même produit. La Sous-Commission approuve vivement cet effort.

6° Lors de la réunion du 3 juillet, les Prof. B. LEWIS (Etats-Unis) et E. STARKMAN (Etats-Unis), Président et Secrétaire de la Sous-Commission Gaz*, font part aux membres présents, du désir de la Sous-Commission Gaz de poursuivre son travail en tant que Commission plénière rattachée à la Division de Chimie Physique. Ce souhait est approuvé à l'unanimité des membres présents.

A la suite de cette décision, les membres de la Sous-Commission Etats condensés expriment le souhait que leur Sous-Commission poursuive son travail en tant que Commission rattachée à la Division de Chimie minérale.

7° A la suite du départ souhaité de la Sous-Commission Gaz de la Division de Chimie minérale, il est procédé à l'élection d'une Commission des Hautes Températures complète, spécialisée dans le domaine des états condensés.

Parmi les anciens membres titulaires, le Prof. G. CHAUDRON, le Prof. F. TROMBE et le Dr M. FOEX ne sont pas renouvelables. Les Prof. H. NOWOTNY et H. FLOOD, nommés en 1961, sont réélus pour une nouvelle période de 4 ans (1965–1969).

D'autres membres titulaires nouveaux sont élus, cependant que des membres associés sont élus ou réélus.

* Autres membres de la Sous-Commission Gaz présents: Prof. W. LOCHTE-HOLTGREVEN (Allemagne), Prof. LAFFITTE (France), Prof. L. DEFFET (Belgique) Prof. G.G. WAGNER (Allemagne), Prof. MANSON (France).

II.3 Commission on High Temperatures and Refractories

II.3.2 Sub-Commission on Gaseous States

Convened: 2 July, 1965, 9–12 hours and 14–18 hours

Present: Dr. B. LEWIS (USA), Chairman; Prof. E. STARKMAN (USA), Secretary; Prof. W. LOCHTE-HOLTGREVEN (Germany); Prof. L. DEFFET (Belgium), Associate; Prof. G. WAGNER (Germany), Associate.

Observers: Prof. N. MANSON (France), Prof. P. LAFFITTE (France), Dr. W. HORTON (USA), Dr. J. DIAMOND (USA), Dr. R. WALKER (USA), Dr. N. BRIGHT (Canada).

(1) Dr. DIAMOND reported on the status and distribution of bibliographies on high temperature gases. Seven issues of the Gaseous State Bibliography have been published since the London Meeting of the Sub-Commission in 1963. They appeared as of the end of every calender quarter except July, August, September, 1964, when no material was submitted. The format established with the September 1961 issue has continued unchanged and Prof. BREWER continues to do the work of compilation:

In the past two years the number of copies printed has increased from 1350 to 1500. Of this number, 1320 copies are distributed to the United States mailing list and 73 copies are sent abroad in bulk; as follows: UK 35, Netherlands 12, Scandinavia 16, and Czechoslovakia 10. These latter are used for further duplication and mailing.

Dr. DIAMOND reported that a questionnaire had been circulated to the distrubution list on high temperature gas bibliographies. Of the 300 returns to this questionnaire; all but two individuals would be willing to pay $15 per year to have the privilege of continuing to receive the bibliographies.

The advisability was discussed for increasing the value and scope of the bibliographies by incorporating material on chemical aspects of plasma. Unanimous approval was given to the proposal. Prof. MANSON has already commenced collecting a bibliography on electrical and thermodynamic properties and agreed to forward his lists directly to Dr. WALKER as soon as finished. Dr. WALKER also agreed to cooperate with Prof. MANSON by supplying the special paper needed for the duplicating procedure.

Prof. LOCHTE-HOLTGREVEN offered to co-operate in the work by supplying bibliographies. Prof. DEFFET agreed to search for someone among his colleagues who would be qualified and willing to aid. Prof. THRING will also be contacted for the same purpose. Dr. BRIGHT indicated that he also had a contact which he would pursue.

(2) Dr. LEWIS reported on progress with the Plasma Symposium at the XXth Congress in Moscow. He noted that this important function of the Sub-Commission had been carried succesfully to a program which is now being administered directly by a committee from the USSR.

Certain questions with respect to the Symposium on Plasma have yet to be approved such as publication. This matter will be pursued at the time of the Symposium and in Moscow.

Admittedly the Symposium on Plasma is not as specialized in its character as the Sub-Commission had planned at the outset, namely to deal principally with chemical aspects of plasma. Partly in consequence, it was the consensus to pursue the scheduling of a future symposium more directly associated with chemistry. It was agreed that this should take place four years hence (1969) preferably at a IUPAC Congress. The subject should be chemical aspects in plasma or transport phenomena in plasma.

In addition, the topic of chemical kinetics in gases at high temperatures, including a brief section on low temperature plasma chemistry is to be scheduled in the more immediate future. Prof. WAGNER agreed to undertake such organization, scheduling for the IUPAC Congress in 1967.

(3) At the Inorganic Chemistry Division Meeting with Commission Presidents on 1 July, Dr. LEWIS had been requested to bring before the Gaseous States Sub-Commission the question of its future. As a consequence the Sub-Commission has developed a proposal which is detailed in the attached "Report to Inorganic Chemistry Division". In essence this requests that the

presently existing Sub-Commission on Gases be dissolved under the Inorganic Chemistry Division and that request be made to reorganize under the Physical Chemistry Division. Such a move would be in keeping with the scope and objections of the present Sub-Commission.

E. S. STARKMAN, Secretary

II.3.2 Sub-Commission on Gases

The Sub-Commission on High Temperature in Gases considered seriously the suggestion of the Inorganic Chemistry Division to reconsider its objectives and position with respect to the Sub-Commission on Condensed States. Of necessity, such consideration includes the program that the Sub-Commission desires to pursue over the next two to four years. This program divides itself into two areas of activity:

(1) The decision was reached to extend the biographies, both with respect to distribution and as to content. It is planned to supplement the biographies with a third section. This will include plasma chemistry. There is already promise from Prof. MANSON to undertake a bibliography on the thermodynamics of plasma. A number of other volunteers have come forward to provide bibliographies in other areas of plasma chemistry. These include contributors from the United Kingdom, Germany, Belgium and Canada.

(2) The Sub-Commission decided to continue its symposia schedule, with two more in the next four years. It would like to hold a symposium on chemical kinetics in gases at high temperatures, to include a section on low temperature plasma chemistry, at the 1967 Congress of IUPAC. Prof. G. WAGNER has agreed to organize this symposium.

The second symposium is planned for the 1969 IUPAC Congress and is on the subject of chemical aspects of plasma, or on transport phenomena in plasma.

The Sub-Commission feels that the holding of symposia is the most successful way of bringing out areas which will in the future require agreements on an international scale involving standardization and codification and perhaps even regulation.

The Sub-Commission feels that implementation of the above program can best be accomplished within IUPAC by a separate Commission charged with these specific functions. The Sub-Commission recommends that the new Commission be titled:

Commission on High Temperatures in Gases and on Plasma Chemistry

Recognizing that the preponderence of subject matter is in the area of physical chemistry, the Sub-Commission expresses the hope that the Inorganic Chemistry Division will agree to the transfer of these activities to the Physical Chemistry Division and will have no objection to the Sub-Commission discussing this matter with the Committee of the Physical Chemistry Division. It is hoped that this transfer can be accomplished during the period of the present conference.

The Sub-Commission on Condensed States is understood to wish to continue its work as a separate commission in the Inorganic Chemistry Division. They will report separately on this matter. However, co-operation will be maintained between the two groups through a liaison appointment of Dr. R. WALKER to both.

BERNARD LEWIS, President

III. ORGANIC CHEMISTRY DIVISION

REPORT ON THE ACTIVITY

The Divisional Committee has held one formal meeting in London in 1963, one in Kyoto in 1964 where most members were attending the Natural Products Symposium, and two in Paris in 1965.

Prof. OURISSON had submitted some suggestions about an activity that IUPAC might consider, which would be an implementation in part of the ideas expressed by Lord TODD concerning scientific information. These views were discussed and finally written up by Prof. BARTON. A copy is attached to this report. It is suggested that this be printed in one of the "Information Bulletins" with an invitation to the readers to send comments to the President of the Organic Division.

A number of the members of the Divisional Committee have become interested in the development of chemotaxonomy, particularly after an initial symposium on this subject organized in 1962 under the auspices of NATO. A meeting took place in London in 1963 at which an *ad hoc* committee was formed. A second meeting took place in Leyden in November 1963 with some help from NATO, and a third meeting in Kyoto at the time of the Natural Products Symposium.

In the meantime the *ad hoc* committee has agreed with a committee of IAPT to act as a Joint International Committee on Chemotaxonomy. Approval of the Council is now asked for the creation of a Commission on Chemotaxonomy to consist of L. MARION, H. ERDTMAN, A. KJAER, G. OURISSON, T. SWAIN, E.C. BATE-SMITH, K. NAKANISHI and R. HEGNAUER. It is understood that no financial support for a meeting will be requested in the current fiscal year.

A plan of desirable symposia in various fields of organic chemistry has been set up for the next four years. The object of this plan is to diversify the topics of symposia and to facilitate the decision as to whether requested sponsorship should be recommended or not.

The Organic Nomenclature Commission has almost completed its work on Section C covering the characteristic groups including the elements C, H, O, N, Hal., S, Se of which a tentative version was printed in 1963. The definitive rules are now set up in print and, after the Commission has discussed the proofs at its meeting in September, will be printed.

Section D is currently being prepared in co-operation with the Inorganic Nomenclature Commission. It covers the characteristic groups: organometallics, co-ordination compounds, phosphorus and arsenic derivatives, derivatives of silicon and perhaps of boron. A tentative version should be published soon.

Some work has been done by the Commission on the nomenclature of carbohydrates in conjunction with the Biochemical Nomenclature Commission and six specialists.

L. MARION, President

Possible modifications in methods of scientific publication

The ever increasing proliferation of the scientific literature both with respect to the number of papers published and to the number of journals in which the papers are contained suggests that revolutionary changes in publication practice might be desirable.

At the present time papers are divided into two classes by refereeing procedures. The main class, containing sound scientific work, is accepted for publication. The minor class (around 5–10% of the total submitted) is rejected on grounds of unsoundness, excessive triviality or manifest incorrectness. It is now proposed that a further division of the main class of acceptable papers be made by the referees. Accepted papers would be divided into two further classes: (A) of exceptional merit, originality and significance, and (B) sound scientific work not falling into class (A). Papers in class (A) would be published fully, as at present. Papers in class (B) would be printed in abstract form only. A copy of the full paper would, however, be made available to Abstract Journals so that the abstracts of papers in both classes (A) and (B) would be equally complete. There would therefore be a record of all new compounds in Abstract Journals as at the present time. The abstract form of papers in class (B) would be provided by authors within limits of space prescribed by the various journals.

The full text of papers in class (B) would be deposited in archives which could be maintained by the Journals, on a national basis, and/or by an international body such as IUPAC. A copy of the full text, or of any part of the text, could be available from the archives by return post on payment of a modest page charge. The advent of speedy copying processes makes this arrangement technically feasible. Papers in class (B) would normally only be consulted in this way when a special interest arose in the experimental procedures reported.

The ratio of papers in class (A) to class (B) might be from 1:1 to 1:4 depending upon international agreement. The savings involved for both publishers and readers would be very significant and nothing would be lost from the scientific literature.

Organic Chemistry Division of IUPAC
Paris, 1965

REPORT ON THE ACTIVITY DURING THE PARIS CONFERENCE

Minutes of the Meeting held in Paris, 7 July, 1965, 14.00 hours

Present: L. Marion (President), F. Weygand (Vice-President), P.D. Bartlett, D.H.R. Barton, H. Erdtman, G. Ourisson. (Mrs. Gunhild Aulin-Erdtman taking notes.)

(1) The President opened the meeting and called attention to a proposal submitted by Prof. G. Ourisson in which he developed some ideas regarding chemical publications. The proposal was first made at the Kyoto meeting, and involved the following points:

(a) The space saved in publications when detailed descriptions of well-known reaction procedures were replaced by references to "standard procedures".
(b) Should the "standard procedures" be picked from the existing literature or worked out specially?
(c) Is it desirable to report analytical results by a simple indication of their divergence from calculated values?
(d) Summaries in different languages.

The discussion showed the general opinion to be that although the suggestion of Prof. Ourisson, especially that involving reference to "standard procedures", would curtail the length of publications, other types of changes might achieve this more effectively. For instance, changes such as the adoption of a telegraphic style with incomplete sentences, or the publication of abstracts or short abbreviated papers, with the complete text being placed in depositories and made available to those interested.

The real problem as pointed out by Prof. Barton is that we work and produce work at the rhythm and under the conditions of today, but still publish in the style of the XIXth century. At the suggestion of Prof. Ourisson the Committee decided not to approve his suggestions but to invite Prof. Barton to submit a more radical proposal for possible modifications in methods of scientific publication, in time to be placed before the Bureau at its meeting of 5 July, 1965.

(2) In a letter to the President of the Division, Prof. Bartlett had suggested that, rather than leave the initiative for the type of symposia sponsored by IUPAC entirely with the organizers as at present, the Division should appoint a "Symposium Committee" who would suggest a programme of meetings four years in advance in order to secure a more balanced coverage of the various branches of organic chemistry than heretofore. This would not only help in deciding whether or not to recommend sponsorship but might induce some people to organize symposia in fields of organic chemistry that are not as well covered as others.

No decision was taken, but it was agreed to discuss this further at the next meeting. It was felt that a committee of young and active people, deeply engaged in research but not yet involved in administrative duties, might work out successfully. It was agreed that for the next meeting (7 July) every member should think of some desirable symposia, and be prepared to suggest a few names for the membership of such an "active committee", should it be decided to form one.

(3) In Kyoto, some questions had been asked about the progress of the work by the nomenclature committee. A report by Prof. Verkade had now been published in the IUPAC "Information Bulletin" 21. It was under-

stood that the Nomenclature Committee was now considering suggestions made by several bodies and that a disagreement with Chemical Abstracts had been settled.

(4) The President gave a brief report on the meetings on chemotaxonomy, which have led to the proposal of the formation of a section or commission on chemotaxonomy within this Division. While its formation is now requested from the Bureau it is understood that no financial support can be given to it during the present year.

(5) A request has just arrived from the Chemical Society of Mexico (Dr. SANTOS AMARO) for IUPAC sponsorship for the Fifth Symposium on the Chemistry of Natural Products to be held in Mexico in 1968. The discussion included a brief report (given by Dr. AULIN-ERDTMAN on the President's request) on the previous symposia in the series including Stockholm 1966. Sponsorship for the Mexican meeting was favoured but the decision was postponed until the Wednesday meeting, to make sure that no other country had requested IUPAC sponsorship for the Fifth Symposium on the Chemistry of Natural Products.

It was agreed that sponsorship should be recommended for the Second Symposium on Photochemistry.—The meeting was closed at 16.00 hours.

Minutes of the Meeting held in Paris, 7 July, 1965, 14.00 hours

Present: L. MARION (President), F. WEYGAND (Vice-President), P.D. BARTLETT, D.H.R. BATRON, K. NAKANISHI, G. OURISSON. (Mrs. GUNHILD AULIN-ERDTMAN took notes during the meeting.)

(1) The minutes of the meeting of 1 July were read and approved.

(2) The question of sponsorship which had been raised at the last meeting was further discussed. The Bureau has reiterated its decision that sponsorship must be requested at least two years in advance. It had been agreed following Dr. BARTLETT's suggestion that were a list made up of desirable symposia in various fields of organic chemistry over the next three or four years the decision as to whether or not to recommend sponsorship would be facilitated. It would also give IUPAC more control over the symposia to which sponsorship is granted.

Since the last meeting the members of the Committee had given some thought to the matter and it was possible to arrive at the following list of desirable symposia.

(a) *Valence tautomerism, cycloaddition and non-benzenoid aromaticity.* Such a meeting might be held in Germany just after the Prague meeting. The number of participants should be 200–250 at the most. Possible lecturers for such a meeting: W.E. von DOERING (Yale), E. VOGEL (Köln), R. CRIEGEE (Karlsruhe), C. NINIZESCU (Bucharest), R. HUISGEN (München), R.B. WOODWARD (Harvard), or ROALD HOFFMANN (Harvard).

(b) *Organic reactions of elemental oxygen.* Possible speakers: C.S. FOOT (UCLA), E.J. COREY (Harvard), K.U. INGOLD (National Research Council, Ottawa), J.R. THOMAS (California Research Corporation), T.J. TRAYLOR (University of California, San Diego), F.R. MAYO (Stanford Research Institute).

(c) *Coordination, Ligands in organic-metal complexes.* If possible to be organized in cooperation with the Inorganic Division, for instance in conjunction with the symposium to be held in Haifa in 1968 on co-ordination chemistry. Possible speakers: H. TAUBE (Stanford University), WILKE (Mülheim), E.O. FISCHER (München).

(d) *Some special topic within the fields of NMR, ESR, quadrupole moments*, to be arranged if possible jointly with the Physical Chemistry Division. Possible contributors: J.D. ROBERTS (California Institute of Technology), H.J. BERNSTEIN (National Research Council, Ottawa), H.S. GUTOWSKY (University of Illinois).

(e) *Mass spectrometry* with the possible co-operation of the Analytical Division. Likely contributor: K. BIEMANN (MIT), who could suggest organizers.

(f) *Metal catalysis.* This topic which might be included with (c) should be of interest to industrial chemists. Possible contributor: A. BRÄNDSTRÖM.

(g) *Chemistry of corrin compounds.* Possible lecturers: A.E. ESCHENMOSER (ETH), MALCOLM CLARK (University of Warwick), A.W. JOHNSON (Nottingham (JOHNSON is a good organizer).

(h) *Organic geochemistry* (1969). J. EGLINTON (Glasgow).

(i) *Special topics in field of antibiotics.* Likely contributors: R.U. LEMIEUX (University of Alberta), K. TSUDA (Tokyo), H. YONEHARA (Tokyo), H. MUSFELDT (Wisconsin) and H. UMEZAWA.

It was suggested by Prof. BARTON that before the next meeting the Members of the Committee be asked to forward further suggestions in writing. It was thought desirable that (a) should take place in 1967, (b) in 1968 in the USA; (c), (g), (i) next; and (d) and (h) in later years.

(3) The request of the Mexican Chemical Society to hold the next IUPAC-sponsored symposium on Natural Products (after Stockholm) in Mexico was considered. It was decided that Dr. MARION, to whom the request had been sent, should write to Dr. SANTOS AMARO requesting him to supply the usual type of information regarding the programme and the speakers to be invited. Although it was agreed that it would be desirable to hold a meeting in Latin America, it was felt that some information as to the programme was necessary before a recommendation could be made.

(4) Following the decision of the previous meeting, Prof. BARTON had prepared some recommendations regarding scientific publications going much further than the suggestions originally made by Prof. OURISSON (see p. 193). It was decided to request Dr. MORF if the Bureau approved to publish these recommendations in one of the "Information Bulletins" in order to see what sort of reaction they would raise among organic chemists.

(5) The names of the members of the new Commission on Chemotaxonomy were noted. They are: L. MARION (Chairman), H. ERDTMAN, A. KJAER, R. HEGNAUER, G. OURISSON, T. SWAIN (Secretary), E.C. BATE-SMITH, K. NAKANISHI.

(6) After the elections for the new term (see p. 54), Prof. WEYGAND thanked the retiring President for the work he had done during his term of office and adjourned the meeting.

PAST, PRESENT, AND FUTURE WORK OF THE IUPAC COMMISSION ON THE NOMENCLATURE OF ORGANIC CHEMISTRY

Questions which have come to me from various quarters have shown the desirability of giving a brief survey of the work of the IUPAC Commission on the Nomenclature of Organic Chemistry since its revival after the second world war and of its programme for the near future.

About 1948 the Commission started a revision and extension of the Liège Rules for the Nomenclature of Organic Chemistry, the so-called Definitive Report of 1931. The present state of this work is as follows:

(1) *Section A, hydrocarbons*, and *Section B, fundamental heterocyclic systems*, of the *IUPAC Rules for Nomenclature of Organic Chemistry*, known as the IUPAC 1957 Rules, were published for the Union in 1958 in *definitive* form by Butterworths Scientific Publications, London; they form the main part of the well-known and widely spread "Blue Book". The rules in question have been reprinted in the Journal of the American Chemical Society *82* (1960), pp. 5545–5574, and in the Handbook for Chemical Society (London) Authors (1961), pp. 47–131. Translations or better adaptations of the original English text have been published in several countries.

(2) *Section C* of the Rules under consideration, dealing with *characteristic groups containing carbon, hydrogen, oxygen, nitrogen, halogen, sulfur, selenium and/or tellurium*—it may be remarked that the new term 'characteristic group' is meant to replace the terms 'function', 'functional group', etc., which have never met with general satisfaction—known as the IUPAC 1961 Rules, was printed for the Union in 1962 in a *tentative* version by Butterworths Scientific Publications, London, in a limited number of copies. Copies of this tentative document have been sent to the National Organizations which are the Members of IUPAC, asking for their help in soliciting remarks and comments on the contents from chemists and scientific organizations throughout the world before the deadline of 1 March, 1964. This practice is prescribed by the Statutes of IUPAC and has proved to be a wise one. The response to this request has been encouraging. The remarks and comments received have been used by the Commission in the preparation of the definitive text of Section C, which will be published early in 1966.

This very extensive Section contains much more than can be apparent from the above. The Liège Rules and also the Geneva Rules of 1892 dealt only with substitutive nomenclature. Section C deals also with radicofunctional nomenclature, additive nomenclature, conjunctive nomenclature, replacement nomenclature (*i.e.* 'a' nomenclature for chains) and nomenclature of symmetrical compounds. It contains for the first time rules for the nomenclature of ions, for the choice of the principal characteristic group and the principal chain, etc.

(3) *Section D* of the new Rules will deal with organic compounds containing other elements than those mentioned above, thus with *organometallic compounds, organophosphorus and organoarsenic compounds, organosilicon compounds, organoboron compounds, and related subjects*. Several versions of this Section, which like its predecessors offers many problems to be solved, have already been prepared and discussed. This work is obiously done jointly with the IUPAC Commission on the Nomenclature of Inorganic Chemistry. There is a chance that a tentative version of this Section will soon be available for publication.

(4) *Section E* of the new Rules, the last one, will deal with *stereochemical subjects*. Until now only preparatory work has been carried out by the Commission in this field. This Section will probably be comparatively short.

It seems reasonable to expect that the complete set of *IUPAC Rules for Nomenclature of Organic Chemistry* will be available in definitive form within six years from now. I readily acknowledge, of course, that expectations of this nature are rather dangerous. This set of rules will constitute a document of about 400 pages—about 300 pages (Sections A, B, and C) have already been printed in definitive or tentative form (see above)—whereas the Liège Rules comprised about 10 pages. Although this difference in size can give some idea of the enormous task undertaken by the Commission, it is hardly or not possible for outsiders to imagine how much time and energy is demanded from each Member of the Commission. The Commission can meet, thanks to funds made available by IUPAC, once a year for about six working-days only; much further work has to be done by correspondence, by exchange of documents. This procedure inevitably slows down the work. On the other hand it must be well understood that good nomenclature work needs close attention and very careful consideration and therefore takes much time.

The work of the Commission discussed until now deals with general chemical nomenclature, but the Commission has been, and is also engaged in work on nomenclature for special fields of organic chemistry. It is important that such "Specialised" nomenclature shall not conflict with existing general nomenclature. The following details about this work may be welcome:

(a) In 1949 the Commission published *definitive* rules for the *Nomenclature of Organosilicon Compounds*, which have proved to be very useful. These can be found in the Comptes Rendus de la 15e Conférence de l'Union Internationale de Chimie pure et appliquée. Amsterdam, 1949, pp. 127–132, and for instance also in the Handbook for Chemical Society (London) Authors (1961), pp. 115–119. These rules will be incorporated into Section D of the new IUPAC Rules for Nomenclature of Organic Chemistry, probably without important changes.

(b) On the basis of work done by a group of steroid chemists and jointly with the IUPAC Commission on the Nomenclature of Biological Chemistry, the Commission has prepared a *definitive* set of *Rules for Nomenclature of Steroids*. These rules were first published as a part of the "Blue Book" mentioned above and then reprinted in the Journal of the American Chemical Society *82* (1960), pp. 1577–1581, and in the Handbook for Chemical Society (London) Authors (1961), pp. 132–139. Translations of the original English text have appeared in several countries. The work on the nomenclature of steroids is being continued.

(c) Again jointly with the IUPAC Commission on the Nomenclature of Biological Chemistry the Commission has recently started the transformation of the wellknown Anglo-American rules for the *nomenclature of carbohydrates* into an international set of rules. During a meeting of Members of both Commissions with a number of specialists in the field of carbohydrate chemistry a first version of such a set of rules differing from the Anglo-American rules in only a few more or less important points, has been prepared. The next step will be a discussion of this version by the two Commissions.

(d) A special topic of another nature with which the Commission is engaged, is the *nomenclature of organic molecules containing labeled atoms*. In this connection attention may be drawn to a French report published in the IUPAC Information Bulletin No. 20 (Dec. 1963), pp. 27–29. Remarks

and comments on this text will be welcomed by the Secretary of the Commission, Dr. H.S. Nutting, the Dow Chemical Company, Midland (Mich., USA).

Finally it may be useful to mention the present composition of the IUPAC Commission on the Nomenclature of Organic Chemistry. Titular Members: R.S. Cahn (London, England), L.T. Capell (Columbus, Ohio, USA), G.M. Dyson (Loughborough, England), G. Kersaint (Paris, France), N. Lozac'h (Caen, France), H.S. Nutting (Midland, Mich., USA) (Secretary), S. Veibel (Copenhagen, Denmark), P.E. Verkade (The Hague, Netherlands) (Chairman); Associate Members: L.C. Cross (London, England), K.L. Loening (Columbus, Ohio, USA). The addresses of these Members can be found in the Comptes Rendus de la 22e Conférence de l'Union internationale de Chimie pure et appliquée, Londres, 1963. It must be hoped that it will be possible to bring the work on the IUPAC Rules for Nomenclature of Organic Chemistry to a successful end without considerable change in the present Membership of the Commission. Indeed, such a change might easily lead to inconsistency in the results of the work; in this connection it must be borne in mind that most of the Members of the Commission have served as such for many years already, are very well acquainted with the problems and intricacies of the work and have gradually built up a common philosophical background which has considerable influence on the nature of their nomenclature work and decisions.

P.E. Verkade

IV. BIOLOGICAL CHEMISTRY DIVISION

REPORT ON THE ACTIVITY

The work of the Division has been focussed mainly on biochemical nomenclature and clinical chemistry.

Of major importance was the consummation of a plan under which the Commission on Biochemical Nomenclature and the corresponding Commission of the International Union of Biochemistry (IUB) will meet together and act as a unit on recommendations concerning biochemical nomenclature, whereas each Commission of five members will continue to be responsible to its parent Union. This unusual arrangement, devised by Prof. KLYNE, the President of the Commission, will have the advantage of conferring the prestige of IUPAC and IUB on rules of biochemical nomenclature since the recommendations of the combined Commissions must be approved and adopted by both Unions, as provided in their Statutes.

The combined Commissions met in Anif, Austria, 23–25 September, 1964, and, as the first order of business, adopted the following nomenclature for themselves: "IUPAC-IUB Commission on Biochemical Nomenclature" with the abbreviation, CBN. The following subjects were discussed: abbreviations of aminoacids and the formulation of polypeptide sequences; abbreviations of carbohydrates; abbreviated formulations of polynucleotide sequences and associations; coenzyme nomenclature; designation of subunits in proteins; and nomenclature and terminology of quinones with isoprenoid side chains, folate compounds, lipids, cyclitols, and miscellaneous compounds of biochemical importance formerly included in the "Vitamin" section. Stemming from these discussions and the reports of the appropriate Sub-Commissions, Tentative Rules are now in hand concerning Folic Acids and Related Compounds (to replace Rule V-13), Corrinoids (to replace Rule V-15), and Quinones with Isoprenoid Side Chains (to replace Rule V-4). Omission of Rules V-9, V-10, V-12, and V-14 was proposed, and Rule V-11 is under consideration within the wider question of Cyclitols. The remaining "Vitamin" rules were brought together in a set of Tentative Rules entitled "Trivial Names of Miscellaneous Compounds of Importance in Biochemistry" as Rules M-1, M-2, M-3, M-5, M-6, M-7, M-8, and M-16 (to replace the corresponding V numbers). Work is under way on the nomenclature of Cyclitols and Lipids, and on Semitrivial Names for Peptides. In these and certain other matters of concern to the Division of Organic Chemistry, work is being carried on in conjunction with its Commission on Nomenclature.

At its meeting in Detroit, USA, 17 August 1963, the Commission on Clinical Chemistry decided to undertake the formidable task of standardizing the units to be employed in reporting the results of clinical chemical analyses. The need for and importance of this endeavour can scarcely be exaggerated. At present, a chaotic situation exists. For example, the concentration of a compound in blood serum may be reported in different countries, or by different clinical chemists within the same country, as g/100 ml, g/l, meq/l, or mg% which means literally milligrams per 100 milligrams, but which is commonly intended to mean mg/100 ml or mg/100 g. Misinterpretation of clinical chemical data may place the health, or even the life, of a patient in jeopardy. The adoption by IUPAC of standard units for clinical chemical data would be of great value to clinical chemists and, indirectly, to members of the medical profession and the patients whom they treat. The Division gives its full support to this undertaking of the Commission on Clinical Chemistry.

WARREN M. SPERRY

REPORT ON THE ACTIVITY DURING THE PARIS CONFERENCE, 1965

The *Division* met once and elected Prof. HOFFMANN-OSTENHOF (Austria) and Prof. FAVARGER (Switzerland) as members of the Division Committee to replace Prof. BERGSTROM (Sweden) and Prof. CEDRANGOLO (Italy) whose terms had expired.

The work of the Division was discussed with emphasis on the importance of maintaining liaison between biochemistry and the profession of chemistry as represented by IUPAC. It was stressed that the value of such liaison was well exemplified by the highly successful combination of the IUPAC and IUB Commissions on Biochemical Nomenclature.

Several Members of Commissions stated that the meeting of the entire Division had been of interest and profit to them.

The *Division Committee* met twice and also transacted some business during the meeting of the Division. Besides the nominations (see p. 57), the following actions were taken, each by unanimous vote:

(1) The request of the Commission on Biochemical Nomenclature to meet in Sweden during 1966 was approved.

(2) Approval of a meeting of the Commission on Clinical Chemistry at Munich during 1966 was reaffirmed.

(3) Reports from the Nomenclature and Clinical Chemistry Commissions were received with high commendation.

Prof. HOFFMANN-OSTENHOF, newly-elected Chairman of the Nomenclature Commission, reported that the Combined IUPAC and IUB Commissions had considered 12 documents in 1963, 34 in 1964, and 10 in 1965. Sub-Commissions have dealt with folic acids, quinones, cyclitols, lipids, aminoacids in peptides, corrinoids, and symbols for biopolymers. In addition to the published tentative rules, reports are expected soon on lipids, synthetic polypeptides, and biopolymer nomenclature. Co-operative activities have been conducted with the Commission of Editors of Biochemical Journals (CEBJ) of IUB, the Commission on Nomenclature of the Division of Organic Chemistry (carbohydrates), and the International Union of Nutrition.

Prof. COURTOIS, Chairman of the Commission on Clinical Chemistry, reported that the Commission had undertaken the difficult but much-needed task of standardizing the units employed in reporting clinical chemical data.

(4) The Committee approved, in principle, a proposal that a symposium on pharmaceutical chemistry be organized and sponsored jointly by the Divisions of Organic Chemistry, Biological Chemistry, and Applied Chemistry. Prof. COURTOIS was selected to act as the representative of this Division on a committee to implement this proposal, if such a committee should be organized.

(5) Some potential interest was expressed in a symposium on smell, suggested informally by an Australian delegate to the Council, but the proposal was considered to be too tenuous to merit formal action.

(6) The Committee discussed the possibility and desirability of an association of the International Federation of Clinical Chemistry with IUPAC under Statute XI. This matter will be explored by members of the Commission on Clinical Chemistry during the Congress of the Federation in Munich in 1966.

IV.1 Commission on Biochemical Nomenclature

This Commission held 7 meetings, all with the corresponding Commission of IUB; one of these was a joint meeting of the two Commissions with CEBJ. In addition, the members of the Commission attended the meeting of the Division (see above).—The following actions were taken:

(1) Prof. HOFFMANN-OSTENHOF (Austria) was nominated as a Titular Member and he was elected as Chairman. (Note: By agreement, the Chairmanship of the combined Commissions is rotated every two years between the IUPAC and IUB contingents. Prof. HOFFMANN-OSTENHOF, an IUB member, was accordingly elected this year to replace Prof. KLYNE (IUPAC). The action was taken by the IUPAC Commission to avoid duplication of effort and to conform with the IUPAC Statutes.)

(2) Prof. BRAUNSTEIN (USSR), Prof. FRUTON (USA), Prof. LIÉBECQ (Belgium), and Prof. SLATER (Netherlands) were nominated as Associate Members. (Note: All of these men are members of the IUB component of the combined Commissions. The action was taken to bring about further "cross-linking" between the two parts of the Combined Commissions.)

(3) It was voted to meet in Gothenburg (Sweden), 4–6 July, 1966, if approval by the Division Committee and Bureau is obtained.

(4) A proposal to meet in the United States during the spring of 1967 was tentatively adopted, but a formal request for approval was deferred.

Most of the time was spent on the work of the Commission; i.e., the consideration of rules for biochemical nomenclature. The Secretary's Minutes record 43 topics which were discussed, most of them with definitive action.

IV.2 Commission on Clinical Chemistry

This Commission met four times, and its members also attended the meeting of the Division (see above). The following actions were taken:

(1) It was voted to meet at the time of the 6th International Congress in Munich in 1966. (Note: It is essential that the Commission meet with the International Federation of Clinical Chemistry which it created. This meeting has already been approved.)

(2) A meeting of a Sub-Commission (see below), originally scheduled for early in 1965, was rescheduled at Copenhagen, 23–24 November, 1965. (Note: Funds for this meeting are in the budget.)

A group of Danish clinical chemists has submitted to the Commission a comprehensive (65-page) proposal for standardizing the units used for reporting clinical chemical data. A Sub-Commission [COURTOIS (France), MACLAGAN (UK), RUBIN (USA), and SANZ (Switzerland)] was appointed to study this proposal. A meeting of this Sub-Commission will be held in Copenhagen (see above), so the authors of the proposal can participate in the discussions.

The Commission has also undertaken a survey of the training of clinical chemists. One meeting was devoted largely to the presentation of reports concerning the status of clinical chemical training in several countries. Each report was given by a Member of the Commission or a National Representative on the situation in his own country. These reports and the discussions of them confirmed the impression held by the President (who attended the meeting as an *ex officio* member of the Commission) that there was much need for better training in clinical chemistry in most countries of

the world. The conclusions reached on the basis of these reports were expressed in the following words:

> "La Commission a émis le vœu qu'à l'avenir un diplôme spécial de chimie clinique soit nécessaire pour ouvrir un nouveau laboratoire ou prendre possession d'un poste de Chimiste clinicien.
> Ce diplôme serait délivré après un enseignement spécialisé théorique et pratique; celui-ci prendrait la forme d'un enseignement postgradué pour les titulaires de diplômes tels que: Docteur en Médecine, Docteur en Sciences chimiques, Pharmacien, Vétérinaire."

The Commission also discussed the standardization of some substrates and reagents used in clinical chemistry. Prof. RUBIN was delegated to prepare and circulate a report on the standardization of bilirubin.

WARREN M. SPERRY

Commission on Biochemical Nomenclature

Meeting in Paris, 2, 3 and 5 July, 1965

The Commission on Biochemical Nomenclature met in Paris on 2, 3 and 5 July, 1965, at the Faculté de Pharmacie.

Subjects discussed included the following:

(1) Tentative Rules (in Press) on folates, quinones with isoprenoid side-chains, miscellaneous compounds (formerly vitamins) and nucleotides.

(2) Material nearly ready for publication on Revised Tentative Rules on Abbreviations and Symbols (cf. "*Information Bulletin*" No. 20), and corrinoids.

(3) Material in an advanced stage of preparation on aminoacids in polypeptides and semitrivial names.

(4) Material under consideration by Sub-Committees and/or jointly with other bodies (e.g., Organic Nomenclature Commission): carbohydrates, cyclitols, lipids, stereochemical problems, biopolymers, carotenoids, steroids.

In all these matters the importance of liaison with other organs of IUPAC and IUB, other Unions, National bodies, and Editors has been constantly borne in mind.

On 5 July O. Hoffmann-Ostenhof (Austria) replaced W. Klyne (UK) as Chairman of the Commission.

On 8 July the Commission met jointly with the IUB Commission of Editors of Biochemical Journals and the Bureau of IUB, to discuss matters of common interest.

V. ANALYTICAL CHEMISTRY DIVISION

REPORT OF TENTH MEETING (1965)

Place: Paris (France), Conservatoire des Arts et Métiers

Date: *Division Committee*
Friday, 2 July, 2 p.m. to 6.30 p.m.
Saturday, 3 July, 10 a.m. to 1 p.m.
Wednesday, 7 July, 6 p.m. to 6.30 p.m.

Division Committee and Chairmen and Secretaries of the Commissions
Wednesday, 7 July, 2 p.m. to 6 p.m.

Open Meeting with all Division Members
Monday, 5 July, 9 a.m. to 1 p.m.

In the chair: Prof. H. Malissa, Division President, part of time; Prof. P.W. West, Division Vice-President, part of time

Report prepared by Dr. P.N. Degens Jr., Secretary of the Analytical Chemistry Division

Minutes of the Tenth Meeting of the Analytical Chemistry Division

(1) *Welcome*

The President, Prof. H. Malissa, formally opened the meeting on Friday, 2 July, 1965, and extended a warm welcome to all those present.

Of the 51 Titular Members 41 had come to Paris. It was regretted that the following Members were unable to attend: Prof. J.P. Alimarin (USSR), Prof. A.K. Babko (USSR), Prof. S. Mandelstam (USSR), Prof. K.B. Yatsimirskii (USSR), Prof. J. Bjerrum (Denmark), Dr. F. Anson (USA), Prof. P. Delahay (USA), Dr. E. Sawicki (USA), Prof. E. Bayer (Germany), Prof. F. Feigl (Brazil).

It was appreciated that the following Associate Members had come to attend the Division Meetings: Dr. R.G. Bates (USA), Mr. L.S. Birks (USA), Prof. G. Charlot (France), Dr. H. Guyer (Switzerland), Prof. D.N. Hume (USA).

The President hoped that the very full agenda would be dispatched without too much trouble in the next few days and that the meeting would be constructive.

(2) *Report of the Ninth (1963) Division Meeting*

The report of the Ninth Division Meeting in London (UK) in 1963 was approved, signed by the President, Prof. H. Malissa, and handed to the Division Secretary, Dr. P.N. Degens Jr., for filing.

(3) *Election of New Division Committee Members*

The Chairman of the Nomination Committee (1963–1965), Prof. N. Tanaka, announced that on the basis of nominations received and the subsequent elections the following new members were appointed to the Division Committee:

1965–1967 Dr. P.N. DEGENS Jr., re-elected as Division Secretary
1965–1969 Prof. T. FUJINAGA (Japan)
1965–1969 Prof. D.N. HUME (USA)
1965–1969 Prof. H. KAISER (Germany)
1965–1969 Prof. W. KEMULA (Poland)

Prof. TANAKA then handed a report on the conduct of the elections, signed by the Nomination/Election Committee (1963–1965, Prof. N. TANAKA, Prof. J.A. GAUTIER and Prof. A.E. MARTELL), to the Division Secretary for filing.

After the Paris Conference Prof. P.W. WEST (USA) will succeed Prof. H. MALISSA (Austria) as President of the Division. In the period 1965–1967 Prof. MALISSA will act as Vice-President (Past President).

To the Nomination/Election Committee (1965–1967) were elected Prof. J.A. GAUTIER (France) as Chairman, Prof. D.N. HUME (USA) and Dr. P. ZUMAN (Czechoslovakia) as Members, who declared their willingness to sit on the Committee. Subsequently, the two proposed amendments to the rules for nominations and elections (see Appendix I) were discussed. Item 1 was rejected and item 2 accepted. Accordingly, it will no longer be necessary for a nomination to be made by a proposer and two seconders. A proposer will suffice. However, the proposer will have to see to it that he submitted the nominee's statement together with his own before the appointed date of the nomination.

A proposal by Dr. P. ZUMAN to change the geographical distribution of the Members of the Division Committee, was, after some discussion, rejected.

(4) *Amendments to the Rules for the Analytical Chemistry Division*

The four amendments (resolutions) to the rules for the Analytical Chemistry Division proposed by the Executive Committee of the Division (see Appendix II) were discussed in the open meeting with the Division Members. In a meeting of the Division Committee the following was eventually decided:

Item 1: Accepted.
Item 2: Dropped, because unpracticable.
Item 3: Accepted. The Commission Reports (submitted before 1 March of a Conference year) must provide enough details to afford a clear picture of the state of affairs.
Item 4: Dropped. It was recommended, though, that during a Conference the Members of the Division Committee attend the Meetings of the Commissions whenever possible.

(5) *Proposal by Prof. D.N. Hume*

Prof. HUME had submitted a proposal concerning "Nomenclature in Analytical Separation Processes". The Division Committee agreed unanimously that this was an excellent proposal of international scientific importance.

The subject has many aspects, which require good co-ordination. It was therefore proposed to establish an ad-hoc working committee of four to draw up a programme of work. A report on the subject could be available within two years, so that it could be discussed at the next IUPAC Conference (1967).

The following will be invited to sit on the committee: Prof. D.N. HUME (Chairman and Secretary) (USA), also Member of Division Committee; Prof. L.B. ROGERS (USA), New Titular Member of Commission V.6; Dr. F.G. HELFFERICH (USA), Observer of Commission V.6; Prof. T.S. WEST (UK), New Titular Member of Commission V.3.

Actions: (1) Prof. D.N. HUME will ask Professors L.B. ROGERS and T.S. WEST and Dr. F.G. HELFFERICH to co-operate. (2) The Division Secretary will apply to the IUPAC Treasurer for funds for a Meeting in the USA in 1966.

(6) *Report on "The Application of Radioactivity to Analytical Chemistry and the Analysis of Nuclear Materials"*

This report, written by Dr. G.B. COOK (Chairman of the ad-hoc working Committee on Radiochemistry), had been read with interest. The Division Committee was of opinion that radiochemistry is developing so rapidly that it is certainly advisable for IUPAC also to give attention to it (see also Information Bulletin No. 23, June 1965, p. 47, No. 4).

It was decided to submit to the IUPAC Bureau and the Council the proposal to create in the Analytical Chemistry Division a new Commission for Radiochemistry. This proposal was accepted by the Council on the understanding that for the period 1965–1967 the new Commission was to be constituted by five Titular Members (including Dr. A.A. SMALES).

Action: The Division Secretary will inform Dr. G.B. COOK accordingly and ask him to establish the new Commission (name of Commission, names of Titular and Associate Members).

(7) *Working Committee on Teaching Analytical Chemistry*

The co-operation which Prof. L. GORDON (USA) received from his fellow-members has been rather disappointing. Thus, he has been unable to draw up a report for the Paris Conference.

Considering the fact that in 1964 an IUPAC Committee on Teaching Chemistry was established (Chairman Prof. R.S. NYHOLM), it is desirable that this Committee should also know the opinion of the analytical chemists.

It was therefore decided that the Division Committee will now itself draw up a report. An additional motive for this decision was the fact that, as transpired at the meeting, Prof. D.N. HUME has already collected international data on the teaching of analytical chemistry. He undertook to prepare a draft report for the Division Committee before 31 December, 1965.

Action: The Division Secretary will inform Prof. L. GORDON accordingly and thank him for the work done.

(8) *Report on "The Purity of Laboratory Chemicals"*

The extensive discussions on the problems concerning laboratory chemicals revealed much diversity of opinion as to what IUPAC could do. It was therefore decided to establish an ad-hoc Working Committee with the task of going further into the highly diverse aspects of the subject. This work can partly be based on the comments to be received from the various bodies to whom a report has been sent. The Committee could then present its recommendations to the 1967 IUPAC Conference.

The ad-hoc Working Committee will be constituted by: Dr. W.I. STEPHEN (Chairman and Secretary), Member of the Analytical Chemistry Commission V.1; Dr. W.C. JOHNSON, Member of the Analytical Chemistry Commission V.1; Dr. J.H. BUSHILL and Dr. J.C. GAGE, Members of the Applied Chemistry Division.

The ISO/TC 47 (Chemistry), who had taken up the matter of the standardization of laboratory chemicals with IUPAC, had—with the approval of our Division—sent an observer to Paris. This was Prof. ELENA GAGLIARDO (Italy), who was fully informed on the state of affairs by Prof. H. MALISSA and Dr. P.N. DEGENS on 7 July, 1965. She will report on this matter at the

meeting of ISO/TC 47 in London (October 1965). In addition, she will send our Division a more detailed exposition of the ideas of ISO/TC 47 on the subject at issue.

Action: The Division Secretary will inform Dr. W.I. STEPHEN and send him all available documents.

(9) *Programmes of the Six Commissions*

The members of the Division Committee were quite aware of their co-responsibility for the work going on in the various Commissions.

They realized there is a great variety in level of the subjects dealt with by our Division.

In order to obtain a well-balanced future programme it was decided that the Members of the Division Committee would consider this matter, starting from the questions: What subjects should be broached, if we were to start anew ? What set-up would have to be chosen ?

The Division Members will send the Division Secretary an answer to this question before 31 December, 1965.

(10) *Co-operation with the Japan Society for Analytical Chemistry*

From the President of the Japan Society for Analytical Chemistry (Prof. T. TAKAHASHI) a letter had been received concerning their co-operation with our Division.

Our Division Committee decided that our colleagues in Japan should be kept as well informed on the work of our Division as possible. The Division Secretary and the Commission Secretaries will see to this.

(11) *Division Budgets 1966/1967*

The IUPAC fiscal year is from 1 January till 31 December.

Before November of each year the Commission Secretaries must submit their claims for administrative expenses covering the past 12 months to the Division Secretary who will then apply to the Treasurer for reimbursement.

The Biannual Report 1963/1964 of the IUPAC Honorary Treasurer contains a tentative budget 1966/1967 for our Division. Concerning a definite budget for 1966 the Division Secretary will consult with the Treasurer after having asked the Commission's opinions.

Action: The Division Secretary will contact the Commissions and the IUPAC Treasurer.

(12) *Open Meeting with all Division Members*

On Monday 5 July, 1965, an open meeting was held for all Division Members.

The Division President, Prof. H. MALISSA, first outlined his views on the future character of analytical chemistry. Subsequently, the Members were given opportunity to raise points which in their opinion might be of importance for our Division. These were:

(a) The meeting regretted that in the new Statutes of IUPAC a maximum has been fixed for the number of Associate Members. For, such Members do not come upon the IUPAC budget. Therefore, the majority of the meeting agreed to a resolution asking the Division President to raise this point once more in the IUPAC Bureau.

(b) The work of the various IUPAC Commissions is brought to the notice of the chemists in the various countries via publications in the Comptes Rendus of the Conferences, the Information Bulletins and the

periodical "Pure and Applied Chemistry". The meeting was of opinion that this is still insufficient. It was proposed that in the Analytical Chemistry Division the Commission Secretaries will draw up a summary of the current programme of their respective Commissions. These summaries could then be combined by the Division Secretary to a survey suitable for publication. This survey could, after approval by the Secretary General, be submitted via the Commission Chairmen to certain chemical journals for publication.

(c) The Division President and Secretary made a few communications on: IUPAC sponsorship, the financial position of IUPAC, free copies of Division publications; the rights, duties and well-defined responsibilities of IUPAC Titular and Associate Members, the duties of IUPAC officers (see Information Bulletin 23, June 1965, pp. 35–37), and a few decisions of the Division Committee.

It was the general impression of the Members that an open meeting of all Division Members contributes towards closer co-operation. It was recommended that a meeting of this kind be held at each future IUPAC Conference.

(13) *Meeting of the Division Committee with the Chairmen and Secretaries of the Commissions*

On Wednesday 7 July, 1965, a meeting was held of the Division Committee and the Chairmen and Secretaries of the six Commissions.

The Commission officers gave a survey of the state of affairs as regards the work in their respective Commissions and of the future programmes. A number of reports were handed over to the Division Committee to be dealt with further.

The programme of practically every Commission includes the subject of nomenclature, symbols, definitions, etc. This calls for co-ordination. It was therefore decided that the reports dealing with a subject of this kind have to be approved by *all* Commissions.

To improve the co-ordination of the work of the various Divisions in the field of nomenclature and standardization the Paris Conference has established an Interdivisional Committee on Nomenclature and Symbols, with Prof. K.A. JENSEN (Denmark) as Convenor and Prof. R. BELCHER (UK) as Recorder.

In addition the Commission officers gave the names of the Titular Members who will sit on the various Commissions in the period 1965–1967.

The Commission Secretaries will see to it that the minutes of the Commission meetings and the complete lists of Members will reach the Division Secretary before 15 August, 1965.

Commission V.5 brought a number of points (Congress on Polarography, Japan, 1966; publications of Commission reports; Conference time table) to the attention of the Division Committee.

As decided by the Council, the next IUPAC Conference will be held in Prague in 1967.

(14) *Adjournment*

The close of the meeting also saw the end to the terms of office of four Members of the Division Committee, namely Profs. P. DELAHAY, W. FISCHER, R. PRIBIL and N. TANAKA.

The Division President addressed a word of thanks to them for their co-operation and advice in Division matters during the four years of service.

There being no other business, the President then closed the tenth meeting of the Analytical Chemistry Division, wishing members a safe journey home and hoping to see them at the next meeting in Prague (1967).

V.1 Minutes of Meetings of the Commission on Analytical Reactions and Reagents

Date: 2 and 3 July, 1965

Present: Prof. S. VEIBEL (Chairman), Mr. W.C. JOHNSON (Secretary), Prof. M. JUREČEK, Prof. A.K. MUKHERJI, Dr. M. PESEZ, Dr. W.I. STEPHEN, Dr. I. DILARIS (Greece), Observer, part time.

At both meetings the development of the report on Organic Analytical Reactions was discussed and its purpose and scope defined.

Organic compounds will be classified according to functional groups and a method of identification will be recommended for each group. For some groups alternative methods may be given, but the alternatives will be restricted and, in any case, will not exceed five in all.

Qualitative chemical reactions only will be included and no physical methods will appear.

Dr. STEPHEN offered to write a preliminary section of the report on the detection of the elements present, and this offer was accepted. It was also agreed that a third and final section of the report should offer some guidance on the identification of individual members of each functional group, but for experimental details on such methods the reader would be referred to standard works on the subject.

The Chairman will now prepare classified tests from the complete index that has already been compiled. These lists will be compiled in a form similar to those already prepared for the carboxylic acids and primary amines, and will be apportioned to those members who are prepared to deal with the various sections of the work.

The Commission hopes to conclude its work on this project in two years time.

W.C. JOHNSON, Secretary

V.2 Minutes of the Meetings of the Commission on Microchemical Techniques

Date: 2 and 3 July, 1965

Present: Dr. AL STEYERMARK (Chairman), Dr. W. SCHÖNIGER (Secretary), Ing. J. KÖRBL and Dr. R. LÉVY.

Part time: Prof. Dr. H. MALISSA (Division President, ex officio Member of the Commission).

The following items were discussed:

(1) *Recommendation of Test Compounds for Micro-Elemental Analysis*

A summarized report entitled "Recommended Test Substances for Various Elements and Functional Groups" has been submitted to the Division Secretary and by him for publication in "Pure and Applied Chemistry". With this report one of the Commission Projects is finished. At the moment there is in the Commission's opinion no need for additing a revised version. It should be considered, however, if "Pure and Applied Chemistry" or Butterworths resp. cannot bring out this above mentioned report as a booklet instead of a reprint.

(2) *Accuracy of Carbon and Hydrogen Determination* (VEČEŘA *Report*)

This report, written by M. VEČEŘA and J. HARSKA, has been submitted to the Division Committee in July 1964, for approval. During an Executive Committee Meeting of the Analytical Division in Vienna in October 1964, it has been decided that in order to get a proper statistical treatment Prof. H. FIEBER of the Technische Hochschule in Vienna will be asked to study this problem and submit in time a proposal so that the revised report could be ready before the Paris IUPAC Conference.

Since the Commission did not get these proposals, it has been impossible to do so. Therefore it has been decided that after receiving the above mentioned suggestions from Prof. FIEBER, the Commission will ask him to re-calculate all the tables. The evaluation of the results should be done together with Dr. SCHÖNIGER, or—if possible—with Dr. VEČEŘA. The editorial part will be done by Dr. STEYERMARK (USA). The results of this report will be of help for individuals and companies developing automatic C/H apparatus.

(3) *Definitions of "Micro- and Trace-Analysis"*

Since it has been impossible to draft a proposal on this within the last 4 years, this project has been dropped from the program of the Commission.

(4) *Data on Sources of Errors in Micro Elemental Analysis of Difficult Organic Compounds (Project leader: Dr.* R. LÉVY, *France)*

This most important project has been started only in July 1963 due to a delay in getting the approval of the Division Committee. Until the end of January 1965, 90 reports from 46 authors have been received. (See summary by Dr. LÉVY submitted to Dr. DEGENS during the present Conference). It has not been possible to start with the evaluation immediately because 34 reports have been written in Russian language. Since it has not been possible to get the translation paid by IUPAC further delay could not be avoided. By the end of April had all the translations-approx. ¼ made by Miss GEL'MAN (for the reports from her own Institute), the others made on behalf of Dr. LÉVY's Institute and paid by this Institution. Therefore no money by IUPAC is needed anymore for this translations. But it has to be kept in mind that on similar occasions it may not be possible to get translations paid by Commission Members, Institutes or Companies resp. It is the opinion of the Commission that—on the other hand—it is impossible to give material submitted for a project to other members of the Division since this can cause serious complications. It is therefore still very important to reach a principal decision on this problem.

After a long discussion it has been decided that in order to cover the subject completely immediately after the Conference, new announcements will be made in the following Journals: Analytical Chemistry, Microchemical Journal, C & E News, Mikrochim. et ichnoanal. Acta, Z. Analyt. Chemie, Analyst, Analyt. Chim. Acta, Chim. Analytique, Talanta, Chemické listy, Coll. Czech. Chem. Commun.

Additionally Microanalysts known to the Commission Members will be contacted by personal letters.

Deadline for submitting materials will be 1 January, 1966. The report is supposed to be finished before the next IUPAC Conference 1967.

(5) *Project "Accuracy of Fluorine Determination in Organic Compounds"*

Since organic fluorine containing compounds become more and more important the Commission decided to start a Program similar to the VEČEŘA-project (viz 2) and ask for Division approval.

Until now it is a great controversy about the different mineralization procedures and the final determinations resp. It is hoped that by this project Analysts will get help in choosing the right procedure(s) for analysing fluorine compounds. Project leader will be Dr. STEYERMARK; time needed for this project: 2 years at the minimum.

AL STEYERMARK, Chairman
SCHÖNIGER, Secretary

V.3 Minutes of Meetings of the Commission on Nomenclature

Date: 2 and 3 July, 1965

Present: Prof. R. BELCHER (Chairman), Dr. D. AMBROSE (Secretary), Mr. R. W. FENNELL, Prof. W. FISCHER, Prof. E.B. SANDELL, Dr. A.A. SMALES (UK), Observer, part time.

Apologies for absence had been received from Prof. I.P. ALIMARIN, E. BAYER, H.M.N.H. IRVING and Dr. T.S. WEST.
The following matters were discussed:

(1) *List of Simplified Terms for Use of the Analytical Chemist*

A report entitled "Recommendations for the Presentation of the Results of Chemical Analysis", prepared by FENNELL and WEST, was sent to the Division Committee in March for approval. This report is based on the part of the Simplified List affecting research workers and in it an attempt has been made to take note of the comments received from the Adhering Bodies about the earlier draft. During the past year a document has been received from the International Standards Organization corresponding closely with what would have been the second part of the IUPAC List, and in view of this the Commission has recommended that no further work should be undertaken in this part.

In discussion, Prof. FISCHER raised the point that some of the mathematical expressions in our Recommendations were not fully explained and it was agreed that, if they are approved for publication, the matter will be best dealt with by the insertion of a sentence to the effect that the paper is intended for use by people who have some background knowledge of the subject.

(2) *Liquid-Liquid Extraction*

These recommendations were sent to the Division Committee in March but were further discussed in detail and some agreed amendments will be made to the paper. One problem remained unresolved, however, the naming of the term separation factor which is liable to conflict with usage in other fields. This difficulty shows the problem which may arise in any attempt to unify the nomenclature of all separation processes.

(3) *Titrimetric Analysis*

A report, prepared by SANDELL and WEST, was discussed and amended so that it could be presented immediately to the Division Committee. The meeting wished to record its appreciation of the excellence and rapidity with which this work had been done by the two authors.

(4) *Automation*

This report, prepared by FENNELL, was sent to the Division Committee in April.

(5) *Acid-Base Primary Standards*

This report, prepared by the Society for Analytical Chemistry, and now published in the Analyst *90*, 1070, 251, 1965, was passed to the Division Committee with the recommendation that it should be approved by IUPAC.

(6) *Chromatography*

When a special meeting of the Commission was held in November 1964 Prof. BAYER was asked to take responsibility for general chromatographic nomenclature, including ion-exchange, with the possibility in view of extending it to other separation processes. Since that time a report on ion-exchange prepared under the auspices of the National Research Council of the USA has been received. This report was prepared by a working group under the leadership of Dr. F.G. HELFFERICH of the Shell Development Company, Emeryville. Prof. BAYER therefore proposed that HELFFERICH, together with Dr. J.F.K. HUBER (Amsterdam) and Professor J. JANAK (Brno) should be invited to join a working group of this Commission which would also include Dr. AMBROSE, Prof. SANDELL and Prof. O. SAMUELSON (Gothenburg) who has been invited to become an Associate Member of the Commission. This working group will assist Prof. BAYER in drawing up a first draft for wide distribution to interested people for comment. This was approved, but in view of the proposals submitted to the Division by Dr. HUME about a unified nomenclature scheme for all separation processes it was thought that he should also be invited to join the group and that it should possibly include a further two members who have wide knowledge of other separation processes.

(7) *Liaison between Nomenclature Commissions of Different Divisions*

A meeting of Chairmen of Nomenclature Commissions was held. They considered it essential that there should be co-ordination of their work and they asked for official recognition from the Council. The proposed title is the Inter-Divisional Committee on Nomenclature and Symbols.

(8) *Selectivity*

It had been expected that this would be referred to the Commission, but the Chairman reported that for the moment no action is called for. It remains in the hands of himself and the Division President.

(9) *Future Work of the Commission*

It was agreed that the amount of work required to deal with the nomenclature of separation processes precluded any thought of undertaking fresh projects.

D. AMBROSE, Secretary

V.4 Minutes of Meetings of the Commission on Spectrochemical and Other Optical Procedures

Date: 2, 3 and 5 July, 1965

Present: Dr. A.C. MENZIES (Chairman and Secretary), Prof. V. FASSEL, Prof. H. KAISER, Dr. E. LOEUILLE, Dr. E.W. SALPETER, Dr. B.F. SCRIBNER, Dr. L.S. BIRKS (Associate Member), Dr. H. GUYER (Associate Member).

The first four meetings were spent in considering the items in the program, while the extra meeting (15 July) was devoted to discussing the problem of literature retrieval, since it is a matter of growing difficulty in all fields.

(1) *Nomenclature, Symbols, and Usage in Analytical Emission Spectroscopy*

Prior to the Paris Conference, a document on nomenclature, symbols, and their usage was prepared by H. KAISER in co-operation with A.C. MENZIES. In this report, the proposals and suggestions made at the London IUPAC Conference (1963) were used. During the intervening two years, details were cleared by correspondence and the general approach was established during meetings of several Members of the Commission.

At the Paris Conference, the Commission dealt with the English text only, leaving the draft of the French, German, and Russian versions to be finished later. The early publication of the English document will not be delayed by the preparation of the translations.

The final document will consist of sections dealing with: (a) General Recommendations; (b) Optical Terms Used in Spectroscopy; (c) General Terms Used in Analytical Emission Spectroscopy; (d) Photographic Photometry; and (e) Excitation Sources. Different schemes will be employed to present the final recommendations, including definitions, symbols, equations, and short articles explaining the Commission's recommendations.

All of the terms, symbols, and equations in the document were discussed at the Paris Conference and agreement was reached on substantially the entire document. Only some styling and editing was left to the project leader. The following schedule was established to ensure publication at an early date:

Receipt of revision by Commission Members: 30 August, 1965
Replies and comments to H. KAISER: 30 September, 1965
Receipt of final document by Commission Members—English only 30 October, 1965
Issuance of Multilingual version to Commission Members 30 December, 1965

The English version will be offered to "Pure and Applied Chemistry" for publication.

A section on statistical treatment of data was dropped since this subject was treated by the Commission on Nomenclature of the Analytical Division. H. KAISER was given an opportunity to co-operate in this work.

(2) *Standard samples for Emission Spectroscopy*

This project was dropped when it was learned that the 1963 Edition of the ASTM Committee E-2 compilation ("Available Standard Samples, Reference Samples, and High Purity Materials for Spectrochemical Analysis, STP 58-E") listed most of the standard sample sources in Europe.

(3) *Present Status on Misidentifications in "MIT Wavelength Tables"*

A project to prepare a critical tabulation of errors and misidentifications presently found in the *MIT Wavelength Tables* was undertaken in 1963

under the co-leadership of B.F. SCRIBNER and E. LOEUILLE. The first solicitation of observations has resulted in the collection of approximately 600 reported misidentifications. The Commission is of the opinion that all of the reported misidentifications should be verified by two or three independent observers before they are entered in the final critical tabulation. The Commission is planning to have the final report ready for approval at the 1967 Conference. Following approval, the table of corrections will be submitted for publication in "Pure and Applied Chemistry".

(4) *Spectrophotometry*

The report on "Tables of Spectrophotometric Absorption Data of Compounds Used for the Colorimetric Determination of Elements" by G.V.M. DUYCKAERTS and co-workers was published by Messrs. Butterworth & Co., Ltd., in 1964 in book-form under the auspices of the IUPAC (special issue of "Pure and Applied Chemistry"). Until March 1965 approximately 1050 copies had been sold.

(5) *Minimum Concentrations Detectable*

The feasibility of compiling a general table of spectrographic sensitivities for detecting impurities in various matrices is being explored. Coding forms have been developed so that the data from various laboratories can be directly compared. An experimental trial by Prof. FASSEL has revealed difficulties in relating results and more definite coding and ground rules may be required.

(6) *Extent of Application of Different Spectroscopic Techniques*

Data on the extent of application of various spectroscopic analytical techniques would be of great help to the Commission in establishing relative priorities among several urgent problems which have come to the attention of the Commission. Various schemes are being employed to obtain these data, viz., direct inquiries to manufacturers on number of instruments sold; professional society membership information; and publications in the literature.

(7) *Documentation and Retrieval of Literature in Analytical Emission Spectroscopy*

This program was not undertaken because the Commission felt that it should get involved in actual documentation and retrieval operations. Rather, the Commission felt that the time has come to explore ways and means of: (a) reducing the time lag between the publication of a paper and the appearance of abstracts in the indices to the published literature; (b) designing more efficient techniques for retrieving published information, and (c) organizing effective international co-operation in these tasks. The Commission felt strongly that the duplication of effort which has characterized similar programs in infrared spectroscopy and other fields was regretable and should be avoided.
H. KAISER discussed the DMS peep-hole card system and presented a preliminary tabulation of code words of important scientific concepts in this field. The members of the Commission will be kept informed about the results of further discussions of these problems, which H. KAISER is expected to have.

(8) *Format for the Publication of Emission Spectrometric Methods of Analysis*

The Commission is pleased to announce that the abridged format developed by the Commission and approved in 1963 is now being employed by the journal "Spectrochimica Acta" for reporting the factual data on emission spectrometric methods of analysis.

V.A. FASSEL, Secretary

V.5 Minutes of Meetings of the Commission on Electroanalytical Chemistry

Date: 2 and 3 July, 1965.

Present: Prof. I.M. KOLTHOFF (Chairman), Prof. R.A. ROBINSON (Secretary), Mrs. Dr. BADOZ-LAMBLING, Prof. H. GERISCHER, Prof. W. KEMULA, Dr. E. VIANELLO, Dr. P. ZUMAN, Dr. R.G. BATES (Associate Member), Prof. G. CHARLOT (Associate Member), Prof. N. TANAKA (Associate Member)

(1) *Minutes of the Meeting in London 1963*

The minutes of the meeting in London 1963, already approved by circulation, were tabled.

(2) *Dissociation Constants of Organic Bases in Aqueous Solutions*

Dr. PERRIN's compilation of dissociation constants has now appeared as a IUPAC book published by Butterworths (1965).

It was noted that no information about the publication of this book had been furnished by IUPAC to the Commission. It was suggested that, when a publication initiated by a Commission was being processed, the Chairman of that Commission (or his nominee) be co-opted to the Publications Committee, so that the Commission could be kept informed of progress towards publication. Moreover, as several Members of a Commission usually spent much time on a report before it was forwarded for publication, it was recommended that at least the Titular Members of the Commission should be supplied with a copy of the publication.

(3) *Reports on the purification of solvents*

Two reports, on acetonitrile and on ethylenediamine, have been circulated. These were recommended for publication in Pure and Applied Chemistry. Reports received recently on dimethylsulphoxide (Dr. T.B. REDDY), tetrahydrofuran (Dr. J. BADOZ-LAMBLING), and hydrocyanic acid (Professor G. KORTÜM and Dr. H.H. VAN BIEDERSEE) would be circulated to Members for comments. These should be sent to the author with copies to the Chairman, the Secretary, and Professor CHARLOT who would undertake general editorial supervision of the project. Further reports on acetic acid, dimethylformamide, hydrofluoric acid and N-methylformamide were expected in the near future. Acetone, nitromethane and methylisobutylketone were suggested as further possibilities. Reports should be published in the IUPAC journal as soon as possible. It was intended, when sufficient reports were available, to collect them in one book.

(4) *Nomenclature and Standardization of* pH *Measurements*

"A Proposal for the Practical Measurement of pH in Amphiprotic and Mixed Solvents", by Dr. R.G. BATES. This report had been circulated and was recommended for publication in "Pure and Applied Chemistry".

(5) *Compilation of* pH *data*

(a) Dr. ZUMAN reported for his Sub-Commission on the compilation of polarographic pK data and it was resolved that sample sheets should be circulated, for approval, which would be used in the compilation of critically selected, basic polarographic data and the Sub-Commission would commence by reporting such pK data for carbonyl compounds and for inorganic compounds to the next meeting.

It was recommended that a grant of $300 over two years be made for secretarial expenses and the aid of IUPAC be sought to issue a request in leading scientific journals that workers possessing recent polarographic data should communicate them to Dr. ZUMAN.

(b) A report had been received from Dr. PERRIN about his compilation of pK data for weak inorganic acids and bases: "A card index to literature values has been prepared and it is hoped that a table based on them will be completed early in 1966."

(c) To supplement the compilations of Prof. KORTÜM and Dr. PERRIN, it was resolved that Dr. BATES be asked to be chairman of a Sub-Commission to consider additional data for aqueous solutions which have appeared since these reports and to study data in partially aqueous solvents. The matter of data in entirely non-aqueous solvents could be considered later. The composition of the Sub-Commission would be left to Dr. BATES but the following names were suggested: Dr. ARNETT (USA), Dr. MILLER (Hong Kong) and Dr. SIMON (Switzerland).

(6) *Standard electrode potentials*

Prof. KOLTHOFF was asked to form a Sub-Commission to make a critical compilation of standard electrode potentials and polarographic half-wave potentials in non-aqueous media. Dr. COETZEE and Dr. BRUCKENSTEIN might be invited to co-operate.

(7) *Present Activities*

A brief report on present activities, particularly projects of the Commission, should be published in suitable journals all over the world.

(8) *Liaison Officer from the Electrochemistry Commission*

The Chairman and Secretaries of this and the Electro-analytical Chemistry Commission should confer at some time during each IUPAC meeting, the recommendation to take effect as from the next IUPAC meeting.

(9) *International Congress of Polarography*

Professor TANAKA reported that an International Congress of Polarography organized by the Polarographic Society of Japan and sponsored by the Japanese Society for Analytical Chemistry was to be held in Kyoto, September 1966. It was recommended that IUPAC sponsor this meeting.

(10) *Expenses of the Chairman*

A sum of $100 was requested to meet expenses incurred by the Chairman.

R.A. ROBINSON, Secretary

Minutes of Meetings of the Commission on Equilibrium Data

Date: 2 and 3 July, 1965

Present: Prof. A.E. MARTELL (Chairman), Prof. D. DYRSSEN (acting as Secretary), Prof. H. FREISER, Prof. Y. MARCUS, Prof. L.G. SILLÉN, Prof. G. SCHWARZENBACH, Prof. D.N. HUME (Associated Member).

(1) *Tables of Stability Constants*

Thanks to extremely hard work by MARTELL and SILLÉN the second edition of Stability Constants has been completed and printed by The Chemical Society in London. Considering that this work was carried out as a program of our IUPAC Commission it was felt that the publishers should have this more clearly stated on the front page in the following supplements and new editions.

MARTELL and SILLÉN agreed to continue the compilation through 1966 so that a supplement could be printed in 1967/68. An effort should be made to bring in more distribution and solubility constants (especially in the organic part), and it was decided that DYRSSEN, FREISER and MARCUS should be responsible for this work. It was further suggested that MARCUS should submit a sample paper of constants of ion exchange equilibria. However, the general feeling of the Commission was that ion-exchange resins up till now have not been well-defined systems; the constants therefore only apply to a certain batch of resin. Manuscripts on the supplementary constants should be presented at the next meeting in 1967. By sending out drafts before the meeting it should be possible for all Members of our Commission to make minor or major additions to the final manuscript.

On the basis of a report on computer techniques for collecting data on equilibrium constants, submitted to the Commission by HINDMAN, it was decided that further efforts should be made in close contact with the publishers.

(2) *Standardization of Terminology*

Two Committees for the recommendation of symbols were elected at the IUPAC meeting in London in 1963; SILLÉN (Chairman), DYRSSEN and MARTELL for equilibrium constants in general and DYRSSEN (Chairman), FREISER and IRVING for terms and symbols in solvent extraction. Through active correspondence the two Chairmen reached at a joint draft with comments from many people outside the two Committees, that was discussed thoroughly by the Commission. Extensive changes were made during the meeting, and a final draft to be presented to the Division was worked out. A number of terms in solvent extraction was left to the Committee on Nomenclature of Separation Methods in Analytical Chemistry. A written proposal by HUME to the Division for the work of such a Committee was described to the Commission. It was decided that HUME should represent the Commission in such a Committee.

(3) *Work of the Commission 1953–1965*

It was generally felt that the work of the Commission up till 1965 should be summarized by the previous Chairmen (SILLÉN 1953–1959, SCHWARZENBACH 1959–1961, HUME 1961–1963 and MARTELL 1963–1965). This should be a detailed supplement of the synopsis concerning the activities of the Division 1934–1963.

ARTHUR MARTELL, Chairman   DAVID DYRSSEN, Secretary

PROGRAMME OF THE ANALYTICAL CHEMISTRY DIVISION

1965–1967

Nomenclature in Analytical Separation Processes

This subject has many aspects, which require good co-ordination. An ad-hoc working committee will draw up a programme of work, which will be discussed in 1967.

The working committee consists of Prof. D.N. Hume, Member of the Analytical Chemistry Division Committee; Prof. T.S. West, Titular Member of Commission V.3; Prof. L.B. Rogers, Titular Member of Commission V.6; Dr. F.G. Helfferich, Observer of Commission V.6.

Teaching Analytical Chemistry

To inform the IUPAC Committee on Teaching Chemistry (Chairman Prof. R.S. Nyholm) of the views of the analytical chemists Prof. D.N. Hume will draft a report to this effect, which will be sent to the Analytical Chemistry Division Committee before 31 December, 1965.

The Purity of Laboratory Chemicals

On this subject IUPAC has been contacted by ISO/TC 47 (Chemistry). In this connection Dr. P.N. Degens has drafted a report containing a number of recommendations. There was much diversity of opinion as to what IUPAC might do. Therefore, it was decided to establish an ad-hoc working committee with the task of going further into the highly diverse aspects of the subject.

In 1967 this committee, which consists of Dr. W.I. Stephen and Dr. W.C. Johnson (both of the Analytical Chemistry Division) and Dr. J.H. Bushill and Dr. J.C. Gage (both of the Applied Chemistry Division), will report on the results of their studies.

V.1 Commission on Analytical Reactions and Reagents

(1) *Publications*

The (fifth) report on "Reagents and Reactions for Qualitative Inorganic Analysis", editor P.W. West, has been published in "Pure and Applied Chemistry" *8*, 1, 1–88; 1964.

Up to April 1965, 660 copies of this report had been sold.

(2) *Organic Analytical Reactions*

In the report to be drawn up the organic compounds will be classified according to functional groups and a method of identification will be recommended for each group. Qualitative chemical reactions only will be included and no physical methods will appear.

The report should offer some guidance on the identification of individual members of each functional group, but for experimental details on such methods the reader would be referred to standard works on the subject.

It is hoped that this report will be ready in 1967.

V.2 Commission on Microchemical Techniques

(1) *Recommendations on Test Compounds for Micro-elemental Analysis*

A summarized report entitled "Recommended test substances for various elements and functional groups" has been submitted (March 1965) for publication in "Pure and Applied Chemistry".

With this the subject has now been finalized.

(2) *Definitions of Micro- and Trace Analysis*

There was so much diversity of opinion on these definitions that no agreement could be reached. Consequently, the subject has been dropped.

(3) *Data on "Sources of Errors in Micro-elemental Analysis of Difficult Compounds"*

Until January 1965 90 reports were received from 46 authors, including 34 reports in Russian, which had to be translated.

In order to render the requisite data better balanced another advertisement will be inserted in a number of periodicals, asking for data to be sent.

The report is supposed to be finished in 1967 (project leader Dr. R. Lévy).

(4) *Accuracy of Carbon/Hydrogen Determination*

This report (author Dr. M. Večeřa) was sent (July 1964) to the Division Committee for approval. Unfortunately, the statistical treatment of the numerical material could not stand the test. Prof. H. Fieber of the Technische Hochschule in Vienna has made a proposal as to how the statistical treatment would have to be performed.

The numerical material will now have to be worked out afresh, after which the analytical conclusions can be drawn (project leader Dr. M. Večeřa).

(5) *Accuracy of Fluorine Determinations in Organic Compounds*

Since organic fluorine-containing compounds are becoming more and more important it is the intention to organize for the fluorine determination a co-operative test, as has been done for the C/H determination. Prior to this a statistician will be consulted (project leader Dr. A. Steyermark).

V.3 Commission on Nomenclature in Analytical Chemistry

(1) *List of Simplified Terms for Use of the Analytical Chemist*

A report entitled "Recommendations for the presentation of the results of Chemical Analysis" was sent (March 1965) to the Division Committee for approval.

In 1964 an ISO document ISO/TC 69–82 E/F: "Second draft proposal on Statistical Terminology and Symbols necessary for the proper formulation of ISO Standards" has been received. This document closely corresponds with what would have been the second part of our IUPAC List.

In view of this the Commission will not undertake any further action on this subject.

(2) *Nomenclature and Presentation of Data in Gas Chromatography*

The second, revised, version has been published in Pure and Applied Chemistry *8*, 553–562; 1964.

(3) *Nomenclature of Liquid-Liquid (Solvent) Extraction*

A report was sent (March 1965) to the Division Committee for approval.

(4) *Nomenclature of Titrimetric Analysis*

A report was sent (July 1965) to the Division Committee for approval.

(5) *Definitions in Automation*

A report was sent (April 1965) to the Division Committee for approval.

(6) *Acid-Base Primary Standards*

This report, prepared by the Society for Analytical Chemistry, and now published in the "Analyst" was passed to the Division Committee with the recommendation that it should be approved by IUPAC.

(7) *General Nomenclature of Separation Processes*

This topic will be dealt with in co-operation with the ad-hoc intercommissional working group of which Prof. D.N. Hume is Chairman.

V.4 Commission on Spectrochemical and Other Optical Procedures for Analysis

(1) *Publications*

The report "Tables des données spectrophotométriques d'absorption de composés utilisés pour le dosage colorimétrique des éléments" by G.V.M. Duyckaerts and co-workers has been published (1964) as a special issue (book) of "Pure and Applied Chemistry".

(2) *Nomenclature, Symbols and Units in Analytical Emission Spectroscopy*

A report in the English language is nearly ready (end 1965), only some styling and editing was left. The draft of the French, German and Russian versions will be finished later (project leader Prof. H. Kaiser).

(3) *Commercial Standards Samples for Emission Spectroscopy*

This project was dropped when it was learned that the 1963 edition of the ASTM Committee E-2 compilation ("Available Standard Samples, Reference Samples, and High Purity Materials for Spectrochemical Analysis, STP 58-E") listed most of the standard sample sources in Europe.

(4) *Misidentifications in the MIT Wavelength Tables*

The first solicitation of observations has resulted in the collection of approximately 600 reported misidentifications. All these should be verified

by two or three independent observers before they are entered in the final critical tabulation. This tabulation will be ready in 1967 (project leaders Dr. B.F. Scribner and Dr. E. Loeuille).

(5) *Minimum Concentrations Detectable by Emission Spectrography*

The feasibility of compiling a general table of spectrographic sensitivities for detecting impurities in various matrices is being explored. A definite coding form and ground rules are required (project leader Prof. V. Fassel).

(6) *Extent of Application of Different Spectroscopic Techniques*

Some market research will be done in order to facilitate establishing what subjects are of interest for IUPAC.

(7) *Card System for Analytical Emission Spectroscopy*

The DMS peep-hole card system was discussed and a preliminary tabulation of code words of important scientific concepts in this field was presented.

Prof. H. Kaiser (project leader) will keep the Commission Members informed of the progress in this field.

V.5 Commission on Electroanalytical Chemistry

(1) *Compilation of* pK *Data*

(a) The compilation concerning "Dissociation Constants of Organic Bases in Aqueous Solutions" by Dr. Perrin was published by Butterworth Scientific Publications as a special issue (book) in March 1965. In the first three months after its appearance 450 copies were sold.

(b) Dr. Perrin is now working on a compilation concerning "pK Data for Weak Inorganic Acids and Bases". A card index to the literature values is ready.

(c) The Commission considered it desirable to supplement the work of Dr. D.D. Perrin (see under a and b) and of Prof. Kortüm: "Dissociation Constants of Organic Acids in Water" (see Pure and Applied Chemistry *1* 187ff.; 1960. 1200 copies sold).

Dr. Bates was asked to create a Sub-Commission (with Dr. Arnett (USA), Dr. Miller (Hong Kong) and Dr. Simon (Switzerland)), to undertake sub. c.

(2) *Nomenclature and standardization of* pH *measurements*

Dr. Bates drew up a report on "A Proposal for the Practical Measurement of pH in Amphiprotic and Mixed Solvents". This report was approved by the Commission and was recommended for publication in "Pure and Applied Chemistry".

(3) *Standard Electrode Potentials and Polarographic Half-wave Potentials in Non-aqueous Media*

In 1963 (London Conference) Dr. Zuman observed that several independent compilations of polarographic half-wave potentials were in progress in different institutes.

It was then agreed that he would try to co-ordinate these activities under the auspices of IUPAC.

In connection with the results of Dr. ZUMAN's attempt Prof. KOLTHOFF was now asked to create a Sub-Commission (with Dr. COETZEE and Dr. BRUCKENSTEIN) to draw up a critical compilation for standard electrode potentials and polarographic half-wave potentials in non-aqueous media.

(4) *Compilation of Polarographic* pK *Data*

The Sub-Commission (project leader Dr. ZUMAN) will commence to report critically selected pK data for carbonyl compounds and for inorganic compounds.

To this end suitable sample sheets will first be drawn up.

(5) *Purification of Solvents*

Pure solvents are required for electrochemical studies in non-aqueous media. The following solvents are being studied:

Acetonitrile, report by J.F. COETZEE — approved (1965)
Ethylenediamine, report by A.K. MUKHERJI, S. BRUCKENSTEIN — approved (1965)
Dimethyl sulphoxide, report by T.B. REDDY — received (1965)
Tetrahydrofuran, report by J. BADOZ-LAMBLING — received (1965)
Hydrocyanic acid, report by G. KORTÜM and H.H. VAN BIEDERSEE — received (1965)

In addition, reports are awaited on:

Acetic acid	Hydrofluoric acid
Dimethyl formamide	*n*-Methyl formamide

Further eligible solvents are:

Acetone	Methyl isobutyl ketone
Nitromethane	

Prof. CHARLOT will undertake the general editorial supervision of the project. When a sufficient number of reports are available they will be combined to a book.

(6) *Pro Memoria (1963)*

(a) *Nomenclature*—Attention will be given to the nomenclature of electrochemical data in non-aqueous solutions in relation to stability constants, formation constants, ion-pair constants, etc.

(b) *Potentials of Reference Electrodes in Molton (or Fused) Systems*—Study of the report of Dr. W.J. HAMER.

V.6 Commission on Equilibrium Data

(1) *Project on stability constants*

(a) *Tables on Stability Constants*—The 2nd edition of the "Tables on Stability Constants" has been completed and printed by the Chemical Society (London, UK).

(b) *Future Revisions of the Tables*— Profs. MARTELL and SILLÉN agreed to continue the compilation through 1966 so that a supplement could be printed in 1967/68.

More distribution and solubility constants (especially in the organic part)

should be brought in. Profs. DYRSSEN, FREISER and MARCUS will take care of this.

On the basis of a report (Dr. HINDMAN) on computer techniques for collecting data on equilibrium constants it was decided that further efforts should be made in close contact with the publishers.

(c) *Standardization of Terminology*—The Sub-Commission on Terms and Symbols for Equilibrium Constants in General (SILLÉN, DYRSSEN, MARTELL) and the Sub-Commission on Terms and Symbols in Solvent Extraction (DYRSSEN, FREISER, IRVING) have, through good co-operation, drafted a joint report on the subject. Many experts have commented on this draft report, so that a final report could be written. This was sent to the Division Committee for approval (July 1965).

(2) *Project on solvent extraction*
Collection of solvent extraction data

As agreed upon in 1963, Profs. DYRSSEN and FREISER have already collected solvent extraction data and Dr. MARCUS would also participate in the project.

It was then decided that the project will be restricted to the extraction behaviour of metals and inorganic constituents which involve complex equilibria of analytical interest. It should not be restricted to chelate systems. Stability constants connected with the extraction and distribution equilibria should be included if they can be derived.

This subject will be discussed further in 1967.

V.7 Commission on Radiochemistry

This new Commission will commence its activities on the basis of Dr. G.B. COOK's report: "The Application of Radioactivity to Analytical Chemistry and the Analysis of Nuclear Materials".

APPENDIX I

Rules for Nominations and Elections to the Analytical Chemistry Division

Proposed Amendments

(1) *Structure of the Division Committee*

The paragraph

"The last-mentioned three members may be chosen from other countries, or for outstanding abilities regardless of geographical distribution, always provided that no single country has more than one representative in excess of the above specified members."

To be replaced by:

"The last-mentioned three members will be chosen from European (excl. USSR, United Kingdom, France and German Federal Republic) of African countries, or from Australia."

This change is more in accordance with the reality or elections and it prevents misunderstanding.

(2) *Procedure for Nomination*

The sentence:

"The nomination shall be made by a proposer and two seconders, who shall all be members of the Division."

To be replaced by:

"The nomination shall be made by a proposer, who shall be a member of the Division."

So, as to the nominations, it is proposed to drop the system of requiring two seconders. Stating two seconders seems to be a mere formality in practice.

One proposer per nominee would be quite adequate. However, the proposer would have to see to it that he submitted the nominee's statement with his own before the appointed date.

APPENDIX II

Proposed Resolutions

On the basis of experience gained during the past 15 years the Executive Committee of our Division suggests that the following resolutions be adopted. These resolutions will be brought up for discussion at the IUPAC Conference to be held in Paris in July 1965.

(1) Titular Membership of a Commission has so far been possible without previous Associate Membership. It is proposed that this be altered in that Titular Membership should, as far as possible, be preceded by at least 2 years' Associate Membership.

(2) Proposals for nomination of new members of the Division (in Commissions) are at present submitted only at a Conference, so that the plenary Division Committee has hardly an opportunity to consider the matter during a Conference.

It is suggested that on 1 March of each Conference year at the latest the Commission Secretaries send the Division Secretary a statement (in 10-fold) of their proposals for new Members (Titular and Associate) of their respective Commissions (with full addresses, titles, etc.).

The selection of the members of a Commission is to be based on the programme to be carried out.

(3) Everybody will agree that the scientific programme of the Commissions is one of the pillars on which the existence of the IUPAC rests.

Such a programme should be of international importance and be realized by international efforts.

The Division Committee should therefore have ample opportunity to consider the programmes of the Commissions and the results obtained. This should of course be done in consultation with the Chairmen and Secretaries of the Commissions.

It is suggested that on 1 March of a Conference year at the latest the Commission Secretaries send an extensive report (in 10-fold) to the Division Secretary on the status of the Commission work, as well as on the future programme. This will enable the members of the Division Committee to study the various Commission matters before the Conference and discuss them at the Conference with full knowledge of the facts.

(4) The Analytical Chemistry Division Committee consists of ten Members with a well defined geographical distribution.

The task of the Members is to establish the policy of the Division and to sanction programmes to be carried out by the Commissions as well as proposals for the nomination of new Members of the Commissions.

This task is mainly performed at 1 or 2 sessions of a Conference, while in the intervening period the work is almost exclusively done by the Executive Committee (President, Vice-President and Secretary).

It is desirable that the Members of the Division Committee should be concerned in the work of the Division and Commissions more directly, so that the work means more to them. It is therefore suggested that at the same time, as far as possible, these Members (excluding those of the Division Executive Committee) become also Titular Members of a Commission in whose work they are interested most.

An important additional advantage of this arrangement is that the expenses for the Division Members travelling to an IUPAC Conference are

reduced. The money thus saved can, after approval by the IUPAC Treasurer, be used to enable certain Members of a Commission to meet in a non-Conference year, which is conductive to the work.

It should be born in mind, though that our Division has to work on a maximum budget of $20 000 to 25 000 per two years.

VI. DIVISION DE CHIMIE APPLIQUÉE

RAPPORT SUR L'ACTIVITÉ

depuis la 22e Conférence (Londres, juillet 1963)
et pendant la Conférence de Paris (juillet 1965)

par le Professeur RENÉ TRUHAUT, Président de la Division

I Introduction: Généralités sur les objectifs de la Division de Chimie appliquée

Avant de présenter, de façon sommaire, l'activité de la Division durant les deux années écoulées depuis la Conférence de Londres et la présente Conférence, il m'a semblé opportun de rappeler quelques points essentiels concernant ses objectifs. Mon éminent prédécesseur dans les fonctions de Président, le Docteur J. H. BUSHILL, les a excellemment définis dans un article intitulé «Applied Chemistry», paru dans «Chemistry and Industry» 1963, p. 676–678, un peu avant la Conférence de Londres. Il y a rappelé que le but essentiel de la Division, créée il y a 14 ans et ayant porté le nom de Section jusqu'en 1963, est «de rendre service à l'industrie par tous les moyens par lesquels la chimie peut favoriser la compréhension entre pays et aider le commerce international». Avec un tel objectif, il n'est pas étonnant que, depuis sa création, la Division ait été amenée à élargir progressivement son champ d'activité, de manière à pouvoir entreprendre activement l'étude des grands problèmes de nature chimique intéressant les diverses branches de l'industrie. Ceci s'est traduit par une augmentation du nombre des Sections (9 au total actuellement) et des Commissions qui y sont rattachées. J'ai moi-même proposé, dès ma prise de fonction de Président à Londres, en juillet 1963, et ceci a été accepté par le Bureau et le Conseil, la création d'un Comité supplémentaire, le Comité ad hoc pour le Génie chimique, dans le but d'essayer d'arriver, tout en évitant des charges financières trop lourdes pour l'IUPAC, à l'établissement d'une liaison efficace entre la Chimie d'une part et le Génie chimique d'autre part. Cette liaison m'était en effet apparue très souhaitable en raison de l'existence de problèmes très multiples et en nombre sans cesse croissant auxquels ces deux disciplines sont intéressées en commun, tout en les abordant avec des optiques un peu différentes.

L'activité des Sections et Commissions de la Division de Chimie appliquée couvre donc un domaine extrêmement vaste.

Pour essayer de donner une idée claire de la nature générale des problèmes étudiés, je les diviserai en 2 groupes principaux en soulignant bien qu'une telle classification ne saurait couvrir tous les problèmes de chimie appliquée.

1° Etablissement d'agréments internationaux relatifs aux matières premières et aux produits finis fabriqués et utilisés par les diverses branches de l'industrie. Ces agréments concernent principalement les symboles, la terminologie, les unités, les abréviations, la présentation des données, les tests d'identité, les normes de pureté et la définition des étalons.

2° Etablissement d'agréments internationaux sur les méthodes d'analyse à mettre en œuvre pour le contrôle des produits industriels ainsi que pour leur caractérisation et leur dosage

dans les ambiances et dans les aliments y compris les boissons. Les études dans cette direction ont essentiellement pour but de choisir des méthodes reconnues valables par des essais poursuivis dans un certain nombre de laboratoires et de les recommander à l'industrie pour leur application à l'échelle internationale.

Liaisons de la Division de Chimie appliquée avec les autres Divisions de l'IUPAC

Ce rappel, extrêmement sommaire, concernant la nature des problèmes posés, permet de comprendre que les études des différentes Sections de la Division de Chimie appliquée ne sauraient être menées à bien sans une liaison étroite avec d'autres Divisions de l'IUPAC. A cet égard, la liaison avec la Division de Chimie analytique s'impose de façon toute particulière. C'est la raison pour laquelle a été tenue, à Vienne, les 30 et 31 octobre 1964, une réunion mixte des deux Divisions, au cours de laquelle il a été admis que la Division de Chimie analytique pouvait jouer un rôle consultatif pour la Division de Chimie appliquée en ce qui concerne le choix des méthodes d'analyse de base susceptibles d'être appliquées à des problèmes particuliers. Il a été décidé que les Présidents des deux Divisions prendraient toutes mesures utiles pour assurer auprès des Officiers aussi bien des Comités de Division que des Sections et des Commissions, la diffusion des informations concernant les activités de chacune des Divisions.

Plus récemment, la Commission des Symboles, de la terminologie et des unités de mesure de la Division de Chimie physique, ayant entrepris la révision du Manuel des symboles et de la terminologie physico-chimiques, a estimé qu'un domaine important de la Chimie physique concernait des opérations mettant en jeu des grandeurs représentables par de nombreux symboles et qui ont de nombreux points de contact avec la Chimie appliquée dans un secteur considéré actuellement comme intéressant aussi le Génie chimique. La Commission a estimé que les études dans cette direction devaient être développées en liaison avec la Division de Chimie appliquée, en soulignant que les problèmes de mesure posés à certaines sections de cette Division, notamment celles des plastiques et hauts polymères, de l'alimentation, de toxicologie et d'hygiène industrielle, pouvaient conduire à des notations particulières. Elle a chargé son secrétaire, le Prof. H. Brusset (Faculté des Sciences de Paris), de prendre contact avec moi dans ce but. Après les entretiens que nous avons eus, qui m'ont convaincu de l'intérêt majeur d'une collaboration inter-divisions dans ce domaine, j'ai décidé, en conséquence, de soumettre la question au Comité de ma Division en vue d'arrêter les modalités de matérialisation de cette collaboration.

Ce sont là seulement deux exemples, parmi d'autres, de l'intérêt de l'établissement de liaisons actives entre la Division de Chimie appliquée et d'autres Divisions de l'IUPAC que conditionne l'aspect toujours multidisciplinaire des problèmes de Chimie appliquée.

Liaison avec l'industrie

Un autre impératif pour la Division de Chimie appliquée est *la liaison avec l'industrie*. J'ai présenté sur ce point, à mon avis primordial, un court rapport à la réunion du Bureau tenue à Bâle les 23 et 24 mars 1964. Notre Secrétaire général a tenu à en reproduire les termes dans le «Bulletin d'Information» nº 21, p. 6–8 (texte français), p. 8–10 (texte anglais) et je me permettrai de le citer in extenso:

«1° Liaison avec l'industrie

L'IUPAC doit être, à mon avis, le centre d'informations pour l'industrie en ce qui concerne les règles de nomenclature, les constantes, les normes de pureté et les méthodes d'identification et d'analyse. C'est d'ailleurs une situation de fait que, toutes les fois que se posent des problèmes touchant à ces domaines, c'est l'IUPAC qui est mentionnée comme organisme pouvant répondre de façon valable. A cet égard, toutes les divisions de l'IUPAC ont un rôle à jouer. Il conviendrait toutefois que soit créée une structure permettant de répondre de façon suffisamment rapide aux questions posées.

L'industrie peut, par ailleurs, apporter à l'IUPAC une collaboration extrêmement précieuse en lui fournissant des experts valables. Ceci s'applique particulièrement au domaine de la Chimie appliquée. Les experts de l'industrie sont en effet au courant des problèmes pratiques à résoudre en priorité et peuvent, par suite, orienter l'activité de l'IUPAC vers ces problèmes et, par ailleurs, contribuer de façon active à leur solution. C'est la raison pour laquelle, dans les diverses sections, commissions et groupes de travail de la Division de Chimie appliquée, il s'impose de faire entrer, à côté d'experts appartenant à l'Université ou à des organismes gouvernementaux, un nombre suffisamment important d'experts de l'industrie. Il y aurait même intérêt, en raison des limitations imposées par les règles de l'IUPAC en ce qui concerne le nombre de membres titulaires, à faire appel à des membres associés appartenant à l'industrie et à inviter des observateurs ayant la même origine.

C'est dans cette direction que s'oriente maintenant la politique de la Division de Chimie appliquée. De nombreux exemples de la fécondité d'une telle politique peuvent être fournis. A long terme, cette politique aura l'avantage d'intéresser l'industrie aux travaux de l'IUPAC, ce qui pourrait se traduire par une aide financière appréciable.»

2° Liaison avec d'autres organismes internationaux

Le troisième impératif qui s'impose à la Division de Chimie appliquée, plus peut-être qu'à toute autre Division de l'IUPAC, est la liaison avec les grands organismes internationaux et notamment avec ceux ayant pour tâche d'étudier les problèmes posés, sur le plan de la santé publique, par la diffusion croissante des emplois des produits chimiques dans les conditions de la vie moderne, ce qui comporte comme corollaire l'établissement de méthodes de caractérisation et de dosage de ces agents en vue de permettre les contrôles indispensables. J'ai estimé préférable de développer ce point particulier après avoir présenté la partie du rapport consacré à l'activité des diverses sections, de manière à pouvoir mieux mettre en lumière le rôle primordial que l'IUPAC peut et doit jouer comme Centre d'informations chimiques à l'échelle mondiale.

II Compte-rendu sommaire d'activité des différentes Sections de la Division de Chimie appliquée

Pour donner une vision plus claire de cette activité, j'ai procédé au dépouillement des rapports que m'ont fournis les Présidents et Secrétaires de Sections sur l'activité de ces dernières entre la Conférence de Londres et celle de Paris et pendant la présente session (rapports joints en annexes). J'ai ensuite mis sous une forme synoptique les informations les plus importantes en adoptant le plan suivant:

1° Structure de la Section et des Commissions qui y sont éventuellement rattachées. (Note au moment de la correction des épreuves: Les informations

concernant la composition des Sections et des Commissions qui y sont éventuellement rattachées, sont en réalité groupées avec les informations de même nature relatives aux autres Divisions; cf. page 71 à page 87.)

2º Réunions tenues entre la Conférence de Londres et celle de Paris.

3º Participation éventuelle à des congrès ou symposiums internationaux.

4º Travail effectué: a) pendant l'intersession; b) à l'occasion de la présente Conférence.

5º Publications: a) effectuées; b) envisagées dans un proche avenir.

6º Modifications proposées dans la constitution de la Section lors de la Conférence de Paris.

7º Future activité.

8º Réunions prévues.

VI.1 Section de Bromatologie ou Section d'Alimentation

Y sont rattachées deux commissions:

VI.1.1 Commission des Additifs aux aliments

créée en 1961, après avoir fonctionné comme Comité ad hoc.

VI.1.2 Commission des Substances à l'état de traces

constituée en 1964 pour remplacer la Commission des éléments présents à l'état de traces dans les aliments qui avait terminé la tâche qui lui avait été confiée en ce qui concerne l'étude de méthodes recommandables à l'échelle internationale pour le dosage du cuivre, du plomb et du mercure dans les aliments.

La Commission ainsi rénovée est présidée par le Docteur Henry Fischbach de la «Food and Drug Administration» des Etats-Unis et divisée en deux sous-commissions:

VI.1.2.1 Sous-Commission dite des Mycotoxines

VI.1.2.2 Sous-Commission dite des Aliments fumés

Il convient de souligner que les résultats des travaux de ces deux sous-commissions sont rapportés et discutés au niveau de la Section qui participe ainsi activement à l'accomplissement des tâches fixées.

Réunions tenues entre la Conférence de Londres et celle de Paris (Section d'Alimentation et Commission des Additifs):

New York, juillet 1964, cette ville ayant été choisie pour permettre des contacts et des discussions avec les spécialistes de la «Food and Drug Administration» des Etats-Unis. Les rapports de cette réunion sont joints en annexe (Annexe 1).

Travail effectué

Vaste enquête à l'échelle internationale de la Commission des Additifs aux aliments ayant conduit à l'établissement de fiches de renseignements sur 107 additifs, concernant notamment:

- l'usage de ces additifs dans les pays membres de l'IUPAC en spécifiant la nature des denrées auxquelles ils sont ajoutés et les concentrations utilisées;
- les méthodes employées pour apprécier la pureté de ces additifs;
- les méthodes à mettre en œuvre pour la caractérisation et la détermination quantitative de ces additifs dans les denrées alimentaires.

La Commission a décidé de se concentrer plus spécialement sur ce dernier sujet dont l'étude n'avait été jusqu'ici abordée par aucune autre organisation internationale et est, de toute évidence, primordiale pour le contrôle des additifs dans les denrées alimentaires. Son travail intéresse au premier chef des organismes internationaux tels que l'Organisation Mondiale de la Santé (OMS) et la Food and Agriculture Organization (FAO), surtout depuis la création, en 1963, d'une Commission FAO/OMS du Codex alimentaire. D'autres organisations, comme le Conseil de l'Europe (Sous-Comité pour le contrôle des denrées alimentaires rattaché au Comité de Santé publique) et la Communauté économique européenne (CEE) (Groupes d'experts inter-gouvernementaux et Commission scientifique des additifs aux aliments) attendent également beaucoup des travaux de cette Commission. Tout récemment (mars 1965), le Directeur général de l'Agriculture au sein de la CEE, M. L.-G. Rabot, m'a, après contact avec le Dr Morf, officiellement demandé si l'IUPAC accepterait d'être chargée, dans le cadre du programme d'études de sa direction générale, des travaux de base pour l'établissement de méthodes d'analyse pour le contrôle des critères de pureté des additifs aux aliments. J'ai donné une acceptation de principe avec l'accord du Président de la Commission, en précisant toutefois que les problèmes à résoudre devraient être dûment spécifiés avant tout accord définitif.

Les deux sous-commissions de la Commission des Substances à l'état de traces ont travaillé activement depuis leur récente création.

Celle dite des Mycotoxines a examiné, en priorité, la détermination des aflatoxines produites par certaines souches d'*Aspergillus flavus* proliférant dans certaines conditions sur les arachides et divers produits céréaliers, qui, dans l'expérimentation sur les animaux de laboratoire, se sont révélées comme les composés de très loin les plus actifs en ce qui concerne la potentialité cancérogène vis-à-vis du foie. Elle a fait appel à 7 laboratoires qualifiés à l'échelle internationale pour étudier les méthodes d'extraction et de caractérisation par chromatographie en couche mince des aflatoxines dans les arachides et les produits à base d'arachides.

La Sous-Commission des Aliments fumés à entrepris l'étude du dosage des hydrocarbures aromatiques polycyliques à action cancérogène, et spécifiquement du 3-4-benzopyrène choisi comme indicateur, dans les aliments fumés (poissons et viandes fumés), dans le but d'établir des techniques de fumaison ne comportant pas de risques pour la santé.

Les travaux de ces deux sous-commissions sont activement poursuivis. Ils matérialisent une coopération avec l'Union Internationale contre le Cancer (Commission de recherche et Comité de prévention de la Commission de lutte contre le cancer) à l'instauration de laquelle j'ai personnellement contribué.

Publication envisagée

Rapport de la Commission des additifs aux aliments pour la fin de l'année 1965.

Modifications proposées dans la composition de la Section et des deux Commissions

Aucune, car, actuellement, toute modification serait extrêmement néfaste à la réalisation des tâches entreprises, d'une extrême importance à l'échelle internationale. C'est pourquoi j'ai demandé au Bureau et au Conseil, avec l'accord unanime du Comité de Division de Chimie appliquée, l'autorisation, à titre exceptionnel, de prolongation dans leurs fonctions jusqu'en 1967, des membres dont la durée de service atteignait 4 années en juillet 1965. Il s'agit de: Dr B. Oser, Président de la Section; Prof. A. Frazer, Membre de la Section et Président de la Commission des Additifs aux aliments; Dr

D. W. KENT JONES, Membre de la Section; Prof. J. F. REITH, Membre de la Commission des Additifs aux aliments.

Pour moi personnellement, la prolongation n'est pas nécessaire, puisque, ès-qualité de Président de la Division, il m'est possible de participer activement aux travaux de la Section et de la Commission des Additifs aux aliments dont j'étais membre jusqu'en 1963.

Quant au Dr A. FRANÇOIS, Secrétaire de la Section depuis 1961, il a été réélu, comme le permettait les règles de l'IUPAC, Secrétaire de la Section pour une nouvelle période de 4 ans.

Future activité

– Poursuite du programme de recherches envisagé en liaison avec la FAO/OMS dans le cas de la Commission des Additifs aux aliments.
– Poursuite des travaux des deux sous-commissions de la Commission des Substances à l'état de traces.

Réunions prévues

– Hambourg, août 1966, à l'occasion du Congrès international de Nutrition (3 au 10 août 1966).
– Prague, septembre 1967, à l'occasion de la Conférence de l'IUPAC.

VI.2 Section des Industries de Fermentation

Réunions tenues entre la Conférence de Londres et celle de Paris

Londres, avril 1964 (compte-rendu adressé au Dr MORF en juillet 1964).

Participation à des congrès ou symposiums internationaux

Congrès international de Microbiologie, Londres, avril 1964.

Travail effectué

Pendant l'intersession:
– Enquête à l'échelle mondiale sur les industries de fermentation.
– Rapport de la Commission sur la détermination des huiles de fusel dont le Président de la Section n'estime pas la publication souhaitable dans l'état actuel.

Pendant la présente session:

Discussion des résultats de l'enquête précédemment mentionnée. L'éventualité d'une extension du programme d'études de la Commission, en présence de la multiplicité des applications des techniques microbiologiques à la préparation industrielle de toute une série de composés, a été examinée. Le caractère secret des procédés mis en œuvre industriellement constitue une difficulté importante comportant comme corollaire, là encore, la nécessité d'une étroite coopération avec l'industrie.

Future activité

– Etude de la standardisation des modes d'expression de la teneur en alcool des boissons alcoolisées et des spiritueux;
– standardisation de la mesure d'activité des levures sèches de boulangerie.

Réunions prévues

– Paris, fin août ou début septembre 1966.
– Patronage d'un Symposium international: 3e Symposium international sur les fermentations qui doit se tenir dans les locaux de la «Rutgers University» à New Brunswick, New Jersey (USA), du 3 au 6 septembre 1968.

Une requête a été adressée à cet égard au Président LIGHT par M. DAVID PERLMAN, Président de la Division de Chimie et technologie microbiennes de l'«American Chemical Society» qui a pris en charge l'organisation du Symposium. J'appuie une nouvelle fois cette demande présentée officiellement au Dr MORF par lettre du 16 septembre 1964, en soulignant le désir que j'ai exprimé au nouveau Président de la Section des Industries de la Fermentation, d'étendre le champ d'activité de sa section en considérant l'importance croissante prise, à l'échelle industrielle, par les techniques microbiologiques pour la préparation, non seulement des boissons fermentées, mais encore de nombreux produits industriels ou pharmaceutiques, tels que solvants, amino-acides, antibiotiques, stéroïdes, etc... – Je précise que les comptes-rendus du Symposium susmentionné seront publiés dans le Journal de l'IUPAC. – Evaluation financière: 2857$.
– Participation demandée d'un représentant de la Section (M. BUNKER) au 9e Congrès international de Microbiologie qui se tiendra à Moscou en 1966. – Evaluation financière: 100£.

VI.3 Section des Matières grasses

Structure de la Section

La Section des Matières grasses est une section très spéciale, car, avec ses nombreux représentants nationaux, elle représente un groupement international qui, depuis 35 ans, étudie la standardisation des méthodes d'analyse des matières grasses et de leurs dérivés, en faisant appel à la collaboration d'experts de nombreux pays. C'est en 1936, à Lucerne, que le groupement, dont les travaux activement poursuivis ont conduit à des recommandations périodiques qui font autorité, a décidé de se rattacher à l'IUPAC et singulièrement à la Division de Chimie appliquée au sein de laquelle elle a été individualisée d'abord en division, puis en section. Cette section n'a cessé depuis lors de travailler à l'élaboration de méthodes normalisées qui ont été publiées sous l'égide de l'IUPAC et n'ont pu que contribuer à son prestige. Depuis que l'ISO a commencé à s'intéresser à l'analyse des matières grasses, une liaison s'est progressivement instaurée entre cette organisation et la Section.

En ce qui concerne sa composition, à la suite de la démission du Dr G. WOLFF (France) en 1964, la présidence a été confiée au Prof. H.A. BOEKENOOGEN (Pays-Bas); les fonctions de secrétaire étant assumées depuis 1963 par le Dr H.J. VOS (Pays-Bas).

Réunion tenue entre la Conférence de Londres et celle de Paris

Rotterdam, 14 et 15 septembre 1964

Travail effectué

Pendant l'intersession:

– Etablissement de méthodes normalisées pour:
le dosage du glycérol dans les savons; la mesure de l'indice de benzidine dans les matières grasses;
la détermination des monoglycérides;
la détermination de faibles teneurs en eau;
la détermination du phosphore dans les huiles et les graisses.

Ces méthodes ont été transmises au Professeur WEEDON aux fins de publication.
– En outre, ont été étudiées des méthodes:
pour la détermination des pieds (foots) dans l'huile de lin;

pour la détection des graisses animales dans les huiles et graisses végétales;
la séparation et le dosage des mono-, di- et triglycérides par chromatographie sur colonne;
pour la mesure de la dilatation des graisses;
pour l'établissement de la courbe de solidification;
pour la détermination du point de fusion des graisses («slip point»)

A l'occasion de la présente Conférence:

– Approbation de cinq méthodes nouvelles.

Publications

– en cours: 5e édition des méthodes normalisées pour l'analyse des matières grasses (1964) (Annexe II)
– projetées (voir p. 258: Etablissement de méthodes normalisées)

Future activité

Continuation des études suivantes:

– Détection du cholestérol comme indicateur de la présence de graisses animales dans les huiles végétales.
– Séparation des mono-, di- et triglycérides par chromatographie sur colonne.
– Détermination du point de fusion des graisses («slip point»).

Nouvelles études:

– Dosage de l'arsenic dans la glycérine
– Détermination de l'indice de Kirschmer pour évaluer la teneur en graisse du beurre.
– Dosage des groupes époxy dans les huiles. Ce dernier sujet a été mis à l'étude, en partie sur ma proposition, en raison de l'intérêt sur le plan toxicologique du dosage des groupes époxy dans les produits destinés à l'alimentation de l'homme.

Réunion prévue

– Dublin (Irlande), septembre 1966, sur invitation des membres irlandais. – Sans implication financière pour l'IUPAC.
– En outre, le Professeur Boekenoogen participera, sans frais pour l'IUPAC, à la réunion de la Sous-Commission ISO pour les matières grasses qui se tiendra à *Bucarest* en *septembre 1965*.

Je tiens, en terminant, à souligner que la très grande activité de cette section, s'accompagnant de la circulation de nombreux documents parmi les membres aux fins d'essais collaboratifs et d'approbation de méthodes normalisées d'analyse destinées à la publication sous l'égide de l'IUPAC, justifie pleinement la demande d'une subvention annuelle de 800 $ pour couvrir une partie des frais très importants de secrétariat.

VI.4 Section des Eaux, Eaux d'égouts et Eaux résiduaires industrielles

L'activité de cette section a été surtout d'ordre administratif et il n'y a pas eu de réunion à la Conférence de Paris. Le rassemblement prévu des informations sur les méthodes employées pour l'analyse chimique des eaux dans les pays membres de l'IUPAC n'a pas encore été effectué.

De toute évidence, l'activité de la section a été minime et j'ai proposé au Comité de Division de la réduire à un nombre très limité de membres ayant pour tâche essentielle d'essayer de lui redonner une activité en rapport avec

l'importance, à l'échelle internationale, des problèmes qu'elle se doit d'étudier. Le Comité de Division a estimé qu'aucun travail n'ayant été effectué, il s'imposait de rénover entièrement la section. J'ai été chargé de prendre les contacts nécessaires à cet égard.

VI.5 Section de Toxicologie et d'Hygiène industrielle

Participation à des congrès ou symposiums internationaux

Néant, mais liaison active avec de nombreuses organisations nationales ou internationales intéressées par l'établissement de méthodes normalisées pour le dosage des toxiques industriels ou agricoles dans les ambiances de travail ou dans les prélèvements effectués chez les sujets exposés (avec dans ce dernier cas considération des produits de transformation métabolique).

Travail effectué

Pendant l'intersession:

Essais, par les membres de la section, dans leurs laboratoires respectifs, de méthodes pour le dosage de divers toxiques industriels:
– *dans l'air:* Poussières plombifères; poussières cadmiques; acides totaux; acides chlorhydrique, fluorhydrique et sulfurique; anhydrique sulfureux; hydrogène sélénié; hydrogène phosphoré; bromure de méthyle; ozone.
– *dans l'urine des sujets exposés:* Arsenic, plomb; mercure; phénols dérivés du benzène par dégradation métabolique; métabolites du trichloréthylène (acide trichloracétique + trichloréthanol).
– *dans le sang des sujets exposés:* Oxyde de carbone.
– *dans l'air expiré:* Oxyde de carbone; trichloréthylène; sulfure de carbone; acétone.
– En outre, a été étudié la détermination de l'activité cholinestérasique sanguine pour le dépistage des intoxications par les insecticides organophosphorés.
– Enfin, ont été discutées, sur la base des observations les plus récentes sur les animaux de laboratoire et sur l'homme au travail, les limites tolérables de l'arsenic et de plomb dans l'urine.

Les échanges de résultats ont fait l'objet d'une très importante correspondance.

A l'occasion de la présente Conférence:

Discussion des méthodes soumises à l'étude et adoption de certaines d'entre elles qui vont être transmises, dans les mois qui viennent, au Comité de publication.

A souligner, la participation d'un représentant de l'Organisation mondiale de la Santé, M. Brunier, qui a exprimé le désir de coopération de la Division d'Hygiène industrielle de cette organisation avec la Section de Toxicologie de l'IUPAC.

Publications envisagées dans un proche avenir

– Méthodes pour le dosage dans l'air: de l'anhydride sulfureux, de l'hydrogène sélénié, du trichloréthylène, de l'acétone, du mercure, du plomb, du cadmium.
– Méthodes pour le dosage dans l'urine: de l'arsenic, des métabolites du trichloréthylène.

Modifications proposées dans la constitution de la Section

L'importance qui s'attache à la continuité du travail de cette section, d'un extrême intérêt à l'échelle internationale, me conduit à demander, à titre exceptionnel, avec l'accord unanime du Comité de Division de Chimie appliquée, l'autorisation du Bureau et du Conseil pour la prolongation dans leurs fonctions, jusqu'en juillet 1967 du Dr J.C. GAGE (Royaume-Uni), Président actuel de la Section, et du Prof. W. PIETRULLA (Allemagne Fédérale), au service de l'IUPAC depuis 1961.

Future activité

Continuation des études:

Pour le dosage des acides totaux, des acides chlorhydrique, fluorhydrique et sulfurique, du bromure de méthyle, de l'hydrogène phosphoré et de l'ozone dans l'air.

Pour le dosage des phénols dans l'urine, de l'oxyde de carbone, du benzène et de l'activité cholinestérasique dans le sang.

Pour le dosage de l'oxyde de carbone, du sulfure de carbone et du trichloréthylène dans l'air expiré.

Examen des possibilités d'emploi de tubes indicateurs pour le contrôle des atmosphères polluées.

Nouvelles études à fixer après enquête auprès des nombreuses industries intéressées par les travaux de la Section.

Réunions prévues

– Prague, 1967, avec participation active au Symposium de Toxicologie analytique organisé par les collègues tchécoslovaques.
– En outre, le Dr GAGE et moi-même participerons, ainsi que le Dr MORF, à une réunion organisée du 4 au 9 octobre 1965 par l'OMS sur les limites de variation à l'état normal des taux de plomb, de mercure et d'arsenic dans le sang et dans l'urine de l'homme.

VI.6 Section des Pesticides

Réunion tenue entre la Conférence de Londres et celle de Paris

Rome, 8–10 octobre 1964. Lors de cette réunion, à laquelle j'ai tenu à participer, considérant l'importance qui s'attache à l'échelle internationale à l'établissement de méthodes de détermination des résidus de pesticides dans les aliments, j'ai suggéré que la Section oriente plus spécialement son activité vers l'accomplissement d'une tâche aussi essentielle pour les grandes organisations internationales telles que l'OMS et la FAO, en ayant soin, pour éviter les chevauchements avec les travaux d'autres organisations, nationales ou internationales, de leur demander d'envoyer des représentants à la réunion de la Section lors de la Conférence de Paris afin de pouvoir coordonner, à l'échelle internationale, les travaux à effectuer pour la mise au point des méthodes d'analyse des résidus de pesticides. – Cette proposition a été acceptée.

Travail effectué

A l'occasion de la présente Conférence:

Le rapport d'activité joint en annexe souligne que les différents organismes internationaux représentés à la réunion de la section, en particulier l'OMS, la FAO, l'Organisation européenne de protection des plantes (OEPP), le Conseil de l'Europe et la Communauté économique européenne (CEE), ont accepté le rôle directeur et coordinateur de l'IUPAC en ce qui concerne l'étude des méthodes d'analyse des résidus de pesticides dans les denrées alimentaires. Un représentant du Groupement européen des Associations nationales de fabricants de pesticides (GEFAP) présent à la réunion, a exprimé sa satisfaction de voir l'industrie participer à cette confrontation. Un programme de travail a été établi en fixant des ordres de priorité. L'étude des méthodes de dosage des résidus de pesticides dans les céréales a été considérée comme le problème le plus urgent. En ce qui concerne le choix des pesticides à étudier, il a été tenu compte des recommandations des divers comités d'experts FAO/OMS s'occupant des résidus de pesticides. Un contact étroit sera maintenu avec ces deux grandes organisations ainsi qu'avec l'OEPP et la CEE. L'accent a, par ailleurs, été mis sur l'intérêt qui s'attache à la connaissance des transformations physico-chimiques ou métaboliques des pesticides après leur application sur les végétaux.

Publications

A venir sous forme de fiches techniques.

Modifications proposées dans la constitution de la Section

Création de 2 commissions:

VI.6.1 Commission pour le développement, l'amélioration et la standardisation des méthodes d'analyse des résidus de pesticides

VI.6.2 Commission d'étude de la nature chimique des résidus terminaux de pesticides

Le programme d'étude de ces deux commissions, dont la composition sera transmise au bureau dans les mois qui viennent pour approbation, a été élaboré dans les grandes lignes.

Future activité

Definie par la fixation des objectifs sus-mentionnés.

Réunions prévues pour la Section et les 2 Commissions

– Genève, automne 1966, après les réunions du Groupe de travail de la FAO sur les résidus de pesticides et du Comité mixte FAO/OMS d'évaluation toxicologique des résidus de pesticides prévus respectivement pour mai 1966 et pour octobre 1966, de manière à tenir compte des recommandations de ces réunions. – Evaluation des frais: 2400$

– Vienne, immédiatement avant le 6e Congrès international des pesticides (30 août–5 septembre 1967) que la Section demande au Bureau et au Conseil d'avoir l'autorisation de patronner. Le Président et le Secrétaire de la Section rapporteront à la réunion du Comité de Division à Prague les résultats de leurs travaux. – Evaluation des frais: 3400$

VI.7 Section des Plastiques et hauts Polymères

Réunion tenue entre la Conférence de Londres et celle de Paris

Milan, 21 septembre 1964

Travail effectué

Pendant l'intersession:

– Echange actif de correspondance concernant un document sur les abréviations relatives aux matériaux plastiques et aux élastomères industriels.
– Etablissement, en langue allemande, d'une classification de ces dernières.
– Etude de propriétés mécaniques des diverses matières plastiques en fonction de la température.

Pendant la présente session:

– Discussion des résultats obtenus dans les enquêtes sus-mentionnées.
– Discussion du rapport de J.W. Barrett (Royaume-Uni): «Dynamic mechanical and impact properties of polystyrenes» qui sera présenté au Symposium sur les macromolécules à Prague; 30 août–4 septembre 1965.

Publication envisagée

Documents concernant les abréviations relatives aux matériaux plastiques industriels et leur classification.

Future activité

– Etude des plastiques dans l'industrie automobile.
– Compilation de «Building Code regulations for plastics».
– Compilation de «National standards for plastics and products».

Réunion prévue

– Paris, 20–27 mai 1966: Participation à la 2e Conférence européenne des plastiques et du caoutchouc, à l'occasion de l'exposition «Europlast»; pas d'implication financière pour l'IUPAC.

VI.8 Section des Revêtements de surface

Réunion tenue entre la Conférence de Londres et celle de Paris

Stuttgart (Allemagne), 25–27 octobre 1964

Travail effectué

Pendant l'intersession:

– Etablissement de méthodes recommandables pour l'analyse des huiles siccatives. – Document soumis au Comité des publications en avril 1964.
– Etude collaborative de deux méthodes pour la détermination de l'indice d'hydroxyle des résines alcoylées.
– Etablissement d'un document sur les techniques d'évaluation de la qualité des revêtements.
– Continuation, par M. Rabate, à titre personnel, du travail de rédaction d'un dictionnaire en trois langues pour les termes utilisés dans l'industrie des peintures et vernis. Ce travail avait été commencé par le Sous-Comité de terminologie, mais l'IUPAC n'a malheureusement pu fournir les subventions nécessaires à son achèvement.

A l'occasion de la présente Conférence:

– Discussion des procédés d'évaluation de la qualité des revêtements organiques étudiés à la demande de la Commission d'harmonisation de la Fédération des Associations de peintures, vernis et encres d'imprimerie, avec examen des résultats préliminaires obtenus au cours d'une enquête collaborative effectuée dans 12 laboratoires au cours des derniers mois.

Publications envisagées

– Méthodes pour l'analyse des huiles siccatives, après entente avec la Section des Matières grasses.
– Opuscule sur les méthodes d'évaluation de la dureté des revêtements organiques, dont la transmission au Comité des publications est prévue pour l'automne prochain.

Future activité

– Continuation du travail sur l'analyse des résines alcoylées avec considération de la mesure des indices d'acidité, de saponification et d'hydroxyle, ainsi que de la détermination, qualitative et quantitative, des acides gras, des polyacides et des polyalcools.
– Etude des méthodes d'évaluation des propriétés biologiques des peintures liquides.

Réunion prévue

Zurich, septembre 1966, pour examiner et discuter les résultats des recherches mises au programme. – Implication financière: 1180$

VI.9 Section du Papier, de la Pâte à papier et du Carton

Travail effectué

– Echange d'informations concernant l'analyse chimique du papier, avec une attention particulière portée aux additifs chimiques.
– Programmation du Symposium sur la dissolution des pâtes à papier, prévu à Helsinki du 24 au 27 mai 1966, et pour lequel le patronage de l'IUPAC a déjà été accordé par le Bureau.

Modifications proposées dans la constitution de la Section

– Suppression de l'affiliation à la Section de l'«International Commission for cellulose analysis (ICCA)».
– La Commission pour l'analyse chimique des papiers a été maintenue.

Future activité

– Rassemblement d'informations sur les méthodes d'analyse chimique des papiers en vue de choisir les techniques les plus valables dans l'immédiat.

Réunions prévues

Helsinki, 24–27 mai 1966. – Symposium sur la dissolution des pâtes à papier, patronné par l'IUPAC en liaison avec l'EUCEPA (Comité européen de liaison pour la cellulose et le papier) et organisé par l'Institut finlandais de recherches pour les pâtes et papiers. – Implication financière: 2000$.

Comité ad hoc pour le Génie chimique

Il m'a semblé opportun de reproduire, dans mon rapport général, le rapport d'activité de ce Comité ad hoc rédigé par son président, le Prof. D.M. NEWITT et son secrétaire, le Prof. CATHALA au cours d'une réunion à laquelle le Prof. H. GARDY, Secrétaire de la Division, et moi-même avons participé.

Rapport d'activité

Par décision du Bureau de l'IUPAC, il a été constitué, en liaison avec la Division de Chimie appliquée, un Comité ad hoc pour le Génie chimique. Ce Comité a reçu mission de rechercher dans quelles conditions et dans quelles limites il serait possible d'établir, au sein de l'IUPAC, une liaison efficace entre la Chimie d'une part, et le Génie chimique d'autre part.

Ce Comité ad hoc comprenait quatre membres:

le Prof. NEWITT (Royaume-Uni), Président
le Prof. CATHALA (France), Secrétaire
le Prof. DODGE (Etats-Unis)
le Prof. ZHAVORONKOV (URSS)

Si les conditions géographiques se sont opposées à des contacts directs avec les représentants des USA et de l'URSS, le Président et le Secrétaire du Comité se sont efforcés d'y suppléer par des relations épistolaires.

Des contacts directs ont été établis avec des représentants qualifiés du Génie chimique en Europe Occidentale et en Grande-Bretagne, soit au cours d'une réunion tenue au siège de l'«Institution of Chemical Engineers», 16 Belgrave Square à Londres, soit au cours de réunions de la Fédération européenne du Génie chimique en France, Hollande, Italie et Allemagne.

Il nous paraît que les résultats de ces diverses consultations ont été parfaitement résumées dans une lettre du Prof. NEWITT, datée du 21 juillet 1964, et que le Secrétaire du Comité ad hoc a communiquée aux Prof. DOGDE et ZHAVORONKOV:

«L'IUPAC doit-elle établir une Division ou une Commission de Génie chimique?

La Fédération européenne ne voit pas d'un bon œil cette initiative. Le Royaume-Uni représenté par l'«Institution of Chemical Engineers», considère que cela pourrait constituer une mesure intermédiaire utile. Les Ingénieurs du Génie chimique américain ne sont pas favorables à cette initiative. Etant donné la formation d'une Confédération interaméricaine du Génie chimique, représentant tous les ingénieurs du Génie chimique des Etats-Unis, il semble logique que le premier stade devrait s'établir par des liens entre cette Fédération panaméricaine et la Fédération européenne, l'établissement de ces liens ne requérant pas l'intervention de l'IUPAC.»

Après quelques consultations ultérieures, tant avec les représentants qualifiés de la Fédération européenne qu'avec ceux de la Confédération américaine, nous regrettons de constater que ces deux organisations ne sont pas disposées actuellement à joindre l'IUPAC.

Considérant qu'une collaboration étroite entre l'IUPAC et les Organismes représentant le Génie chimique ne semble pas possible, pour le moment, le Comité ad hoc recommande que ce projet ne soit pas abandonné, mais qu'on attende une évolution des idées dans un sens plus favorable à la coopération.

En attendant, si certaines des Sections de la Division de Chimie appliquée de l'IUPAC ont besoin de s'informer sur les solutions apportées par l'industrie aux problèmes qui leur sont propres, le Comité ad hoc suggère de créer au sein de la Division une Section spécialisée dans la pratique industrielle.

signé par: Prof. NEWITT
Prof. CATHALA

APPENDIX 1 APPLIED CHEMISTRY DIVISION FOOD SECTION

Minutes of the eighth Meeting, New York, July, 1964

(1) *Place, date and time of Meeting*

A meeting of the Commission was held at the Chemists' Club, New York, at 9.30 a.m. on 24 July, 1964.

(2) *Present*

Dr. B.L. Oser (in the Chair); Dr. A.C. François, Secretary; Dr. D.W. Kent-Jones (UK); Prof. A.C. Frazer (UK); Prof. S.W. Souci (Germany); Prof. R. Truhaut (France).

Apologies for absence were received from Prof. J.F. Reith (Holland) and Prof. O. Hogl (Switzerland).

(3) *Agenda*

A Provisional Agenda had been previously circulated. The Agenda was adopted.

(4) *Minutes*

The Minutes of the last meeting, held in London on July, 1963, which had been previously circulated, were taken as read and confirmed.

(5) *Matters arising from the Minutes*

The only item arising from the Minutes was the publication of the analytical methods for lead and mercury, proposed by the Trace Substances Commission. Approval had previously been given for a publication in the *Journal of Applied Chemistry*. It appears that the two final drafts have been on the editor's desk for a long time. The opinion of several members of the Food Section is that analytical methods for Pb and Hg could be published in a separate booklet. The Food Section emphasized that the publication is too long delayed.

(6) *Report of the Chairman*

(a) *New Commissions and Sub-Commissions.*—Dr. Oser said that he has been devoting considerable time to getting up a Trace Substances Commission, composed of Sub-Commissions on Smoke Constituents and Mycotoxins. The members are the following:

Chairman	Dr. H. Fischbach
Titular Members	Prof. P.P. Dikun, Sub-Commission on Mycotoxins
	Dr. J.E. Hoff, Sub-Commission on Smoke Constituents
	Dr. D.J. Tilgner, Sub-Commission on Smoke Constituents
	Dr. W.D. Raymond, Sub-Commission on Mycotoxins
	Dr. G.N. Wogan, Sub-Commission on Mycotoxins
Associated Members	Dr. C. Frayssinnet, Sub-Commission on Mycotoxins
	Dr. T.H. Simpson, Sub-Commission on Smoke Constituents
	Dr. S. Dalgaard-Mikkelsen, Sub-Commission on Mycotoxins

Appointment of Dr. H. Fischbach as Chairman of the new Trace Substances Commission will be submitted for approval to the President of the Applied Chemistry Division. Both Commissions will meet in Paris in July, 1965.

The Commission emphasized problems arising from use of substances containing potentially carcinogenic hydrocarbons (i.e. polycyclic compounds of petroleum waxes and oils).

(b) *Composition of the Food Section.*—Appointment of Dr. H. FISCHBACH as Titular Member of the Food Section was approved. Approval is to be submitted to IUPAC Applied Chemistry Division.

(7) *Report of the Secretary*

Dr. FRANÇOIS informed the Food Section members that the Bureau of the IUPAC has taken the following decision: "In accordance with Statute XI B1 and for exceptional reasons, Prof. O. HOGL and Prof. J. REITH should be allowed to continue in office as titular members of the Food Section of the Applied Chemistry Division until July, 1964." The Chairman expressed once more his thanks to the retiring members. Prof. HOGL, Chairman of Codex Alimentarius, remains as an Associate Member.

(8) *Report of the Food Additives Commission*

The report of activity of the Food Additives Commission was presented by Prof. FRAZER. A very important document including four sub-reports was distributed to members:
- on the use of selected Food Additives in member countries;
- on analytical methods used for calculating purity of food additives in member countries;
- on analytical methods available for assay of food additives in food;
- on problems of obtaining and checking information on analytical methods.

The report will be sent to Dr. KAPSIOTIS with the aim of informing FAO/WHO.

(9) *Introduction and Report of the Chairman of the Trace Substances Commission*

The Food and Drug Administration, FDA, has 12 Divisions (Pharmacology, Microbiology, Food Chemistry, Nutrition, etc.). One of these is *Foods*, of which Dr. H. FISCHBACH is in charge. Dr. FISCHBACH emphasized the importance of mycotoxins. The Sub-Commission will have to study first nonbiological methods of estimation, specifically: standardization of the chromatography assay. It was pointed out that standards are not yet available. Concerning the plan of the Smoke Sub-Commission, Dr. FISCHBACH said that the main problem concerns analytical methods (how many constituents are in smoke)? Acceptable methods for polycylic compounds have to be developed. Extensive reviews on smoke composition and toxicity have already been published.

(10) *Report from the ad hoc Committee in combination with the Food Standards Commission of FAO/WHO*

Prof. TRUHAUT said that a joint meeting of WHO/FAO and IUPAC experts (Applied Chemistry Division) is being considered.

(11) *The next meeting*

of the Section will take place on July, 1965, in Paris, on the occasion of the XXIIIrd IUPAC Conference (2–9 July). In principle, Sub-Commissions will meet on 1 July. The Food Section will meet on 2 and 3 July.

The meeting was adjourned at 5 p.m.

FOOD ADDITIVES COMMISSION

Minutes of the Meeting, New York, July, 1964

(1) *Place, date and time of meeting*

A meeting of the Commission was held at the Chemists' Club, New York, at 9.30 a.m. on Thursday, 23 July, 1964.

(2) *Present*

Prof. A.C. FRAZER (in the Chair); Dr. B.L. OSER, Prof. W. SOUCI, Prof. R. TRUHAUT.

Dr. D.W. KENT-JONES, Dr. FRANÇOIS and Dr. FISCHBACH attended as observers.

Apologies for absence were received from Prof. J.F. REITH.

(3) *Agenda*

A Provisional Agenda had been previously circulated. The Agenda was adopted.

(4) *Minutes*

The Minutes of the last Meeting, held in London in July, 1963, which had been previously circulated, were taken as read and confirmed.

(5) *Matters arising from the Minutes*

The only item arising from the Minutes, but not on the Agenda, was the need for a South American member of the Commission. Approval had previously been given for the appointment, but it had not so far been possible to fill it. Possible candidates were discussed and *it was agreed* that Dr. ARIOSTO BULLER SOUTO, Director of the Instituto Adolfo Lutz, Laboratorio de Saude Publica, Avenida Dr. Arnaldo 3, Sao Paulo (Brazil), should be approached. *It was further* agreed that if Dr. SOUTO was willing to serve, he should be nominated forthwith.

(6) *Report A: On the use of selected food additives in member countries*

Report A was presented. After discussion, *it was agreed:*

(a) that the Commission should confine its attention to those substances that had been considered by the FAO/WHO Expert Committee on Food Additives at the meetings that produced the Third, Fourth and Seventh Reports respectively;

(b) that only a simple table showing use, non-use or prohibition in member countries should be attempted;

(c) that other details of uses, levels of use and limitation of use, where appropriate, should be included in the Monograph of each substance included in the Report. The categorisation of uses as suggested in the Report, was thought to be too difficult to handle. Figures for tolerance levels were felt to be important as a guide to the sensitivity of analytical methods needed.

(7) *Report B: Analytical methods used for determining the purity of food additives in member countries*

Report B was presented. *It was agreed* that the methods should be recorded as shown on the Draft Data Sheets. It was hoped that the principle of the methods could be ascertained and inserted. Where official documents were not generally available, it was not considered useful to include a refernce to it. It was hoped that copies of most of the official documents quoted would be obtained in due course. *It was agreed* that methods would not be checked

but the Commission might recommend that this should be done in some cases.

(8) *Report C: Analytical methods available for assay of food additives in food*

Report C was presented. After discussion, *it was agreed* that reference only to the selected method (or methods) should be given. The answers to the questions listed at the end of Report C were: (1) Yes. (2) Yes. (3) Only exception might be substances already present in food. (4) Yes. (5) No. (6) Nothing.

(9) *Report D: Problems of obtaining and checking information on analytical methods*

Report D was presented. It was reported that satisfactory contact had now been established with 23 out of 37 member countries. Those still not replying were:

(a) Brazil, Argentina, Columbia, Venezuela, Spain, Portugal
(b) Belgium, Italy, Rumania, Israel, UAR
(c) India, Japan, China

Possible lines of approach were discussed. It was hoped that Dr. Souto would deal with the first group. Every effort would be made to find personal contacts in the others.

The other matters in Report D had been or were discussed. *It was agreed* that the Chairman should seek the advice of the Department of the Government Chemist in London on analytical questions.

(10) *Future plans for the work of the Commission*

It was agreed:

(a) That monographs should be prepared for all the substances referred to by the FAO/WHO Expert Committee on Food Additives at their meetings reported in Reports 3, 4, and 7.

(b) That each monograph should give:

(i) *References* to FAO/WHO specifications and identification tests.

(ii) *Uses*: main foods in which used.—Levels of use.—Limitations on use (if any).

(iii) *Analytical methods. Purity:* References to FAO/WHO reports.—Other official methods. (Principle to be given if possible.)

Additives in food: A selected method (or methods) to be chosen in consultation with the Dept. of the Government Chemist in London.

(c) Any table to be simple and show only use, non-use, prohibition, etc.

(d) These documents to be prepared as soon as possible and circulated to member countries and members of the Commission.

(e) Work to be completed in time for final meeting at the end of June or early in July, 1965, in Paris.

(f) Further year of financial support requested for secretarial help.

(g) IUPAC asked to continue to provide analytical information on further groups of Food Additives if and when the FAO/WHO Committee publishes the necessary specifications.

(11) *Report to the Food Section*

A report on the meeting of the Commission, as attached, was approved for transmission to the Food Section.

The meeting was closed at 4.30 p.m.

ANNEXE II

5e édition des méthodes normalisées pour l'analyse des matières grasses adoptées par la Section des Matières grasses

Table des Matières

Section I. Graines et Fruits oléagineux

I. A. Généralités
- I. A. 1. Recommandation
- I. A. 2. Séparation et dosage des impuretés
- I. A. 3. Broyage

I. B. Analyse des graines
- I. B. 1. Dosage de l'humidité
- I. B. 2. Dosage de l'huile

I. C. Analyse de l'huile des graines
- I. C. 1. Acidité

Section II: Matières grasses

II. A. Généralités
- II. A. 1. Préparation de l'échantillon
- II. A. 2. Préparation des acides gras insolubles

II. B. Détermination des caractéristiques physiques
- II. B. 2. Indice de réfraction
- II. B. 3. Titre des acides gras ou point de solidification conditionné
- II. B. 4. Détermination spectrophotométrique de la couleur des huiles et graisses

II. C. Dosage des substances étrangères
- II. C. 1. Eau et matières entraînables
- II. C. 2. Impuretés
- II. C. 3. Cendres
- II. C. 4. Dosage des monoglycérides
- II. C. 5. Dosage de faibles teneurs en eau (méthode Karl Fischer modifiée)

II. D. Détermination des caractéristiques chimiques
- II. D. 1. Acidité-indice d'acide (I_A)
- II. D. 2. Indice de saponification (I_S)
- II. D. 3. Indice d'esters (I_E)
- II. D. 4. Dosage de la matière grasse neutre dans les matières grasses à forte acidité
- II. D. 5. Dosage de l'insaponifiable
- II. D. 6. Stérols
- II. D. 7. Indice d'iode (I_I)
- II. D. 8. Indice de thiocyanogène (I_{SCN})
- II. D. 9. Indice des acides volatils solubles et insolubles
- II. D. 10. Détermination des nombres A et B
- II. D. 11. Indice de polybromures
- II. D. 12. Acides oxydés
- II. D. 13. Indice de peroxyde
- II. D. 14. Indice d'hydroxyle
- II. D. 15. Indice de benzidine
- II. D. 16. Dosage du phosphore dans les huiles et graisses

Section III: Glycérine
III. A. Dosage du glycérol
III. A. 1. Dosage du glycérol

Section IV: Savons
IV. A. 2. Humidité
IV. A. 3. Substances étrangères insolubles dans l'éthanol
IV. A. 4. Acides gras totaux bruts
IV. A. 5. Alcali total
IV. A. 6. Alcali libre total
IV. A. 7. Alcali caustique libre
IV. A. 8. Chlorures
IV. A. 9. Résine
IV. A. 10. Dosage du glycérol dans les savons

Contents

Section I: Oleaginous Seeds and Fruits
I. A. General Notes
I. A. 1. Recommendation
I. A. 2. Separation and determination of the impurities
I. A. 3. Grinding

I. B. Analysis of the seed
I. B. 1. Determination of moisture
I. B. 2. Determination of oil

I. C. Analysis of the oil from the seed
I. C. 1. Acidity

Section II: Oils and Fats
II. A. General Notes
II. A. 1. Preparation of the sample
II. A. 2. Preparation of the insoluble fatty acids

II. B. Determination of the physical constants
II. B. 2. Refractive index
II. B. 3. Determination of titre
II. B. 4. Spectrophotometric determination of the colour of oils and fats

II. C. Determination of foreign substances
II. C. 1. Moisture and volatile matter
II. C. 2. Impurities
II. C. 3. Ash content
II. C. 4. Determination of monoglycerides
II. C. 5. Determination of small quantities of water (modified Karl Fischer method)

II. D. Determination of chemical characteristics
II. D. 1. Acidity—acid value (I_A)
II. D. 2. Saponification value (I_S)
II. D. 3. Ester value (I_E)
II. D. 4. Determination of the neutral fat in highly acid fats
II. D. 5. Determination of the unsaponifiable matter
II. D. 6. Sterols
II. D. 7. Iodine value (I_I)

II.D.8. Thiocyanogen value (I_{SCN})
II.D.9. Determination of soluble and insoluble volatile acids
II.D.10. Determination of the *A* and *B* numbers
II.D.11. Polybromide value
II.D.12. Oxidized acids
II.D.13. Peroxide value
II.D.14. Hydroxyl value
II.D.15. Benzidine value
II.D.16. Determination of phosphorus in oils and fats

Section III: Glycerol

III.A. Determination of glycerol
III.A.1. Determination of glycerol

Section IV: Soaps

IV.A.2. Moisture
IV.A.3. Foreign matter insoluble in ethanol
IV.A.4. Foreign crude fatty acids
IV.A.5. Total alkali
IV.A.6. Total free alkali
IV.A.7. Free caustic alkali
IV.A.8. Chlorides
IV.A.9. Rosin
IV.A.10. Determination of glycerol in soaps

REPORT ON THE ACTIVITIES DURING THE PARIS CONFERENCE APPLIED CHEMISTRY DIVISION

Comité de Division

Le Comité de Division de Chimie appliquée s'est réuni le mercredi 7 juillet au Conservatoire des Arts et Métiers de 14 heures à 19 heures. Sans entrer dans les détails qui font l'objet du compte-rendu de la réunion reproduit en annexe, il me paraît opportun de souligner un certain nombre de points pour donner une idée de l'activité de la Division dans son ensemble. Cette activité a été poursuivie avec l'aide des deux secrétaires, Messieurs les Prof. H. Gardy et P. Bourbon, et en étroite liaison avec l'ancien Président, Dr J. Bushill et le Vice-Président désigné comme « President Elect», le Dr W. Gallay (Canada) auquel j'ai tenu à faire parvenir, au fur et à mesure de sa rédaction, ainsi d'ailleurs qu'au Dr Morf, toute la correspondance échangée avec le Secrétaire général, avec les Présidents et Secrétaires des autres Divisions, avec les Présidents et Secrétaires des Sections et Commissions de la Division, ainsi qu'avec les officiers des organismes internationaux ou de groupements représentatifs de l'industrie avec lesquels j'ai maintenu ou établi des liaisons coopératives dans l'optique que j'ai définie dans mon introduction.

Lors de la réunion du Comité de Division, après l'observation d'une minute de silence à la mémoire du Dr L.A. Jordan, le père de la Section des Revêtements de surface, auquel l'IUPAC doit beaucoup, les rapports d'activité des différentes sections ont été présentés par leurs Présidents ou Secrétaires et soumis à la discussion. C'est à ce point de l'ordre du jour que les membres présents ont voté une motion pour la rénovation complète de la Section des eaux, égoûts et eaux résiduaires, dont l'activité avait été exclusivement d'ordre administratif pendant les deux années écoulées, et m'ont chargé de prendre les contacts nécessaires en vue de sa reconstitution en faisant appel à l'aide du Secrétaire général pour obtenir des propositions de noms d'experts de la part des délégations des pays adhérents.

C'est également à ce point de l'ordre du jour que le Comité a donné à l'unanimité un avis favorable à ma proposition de demander au Conseil de proroger, à titre exceptionnel, le mandat de certains des membres de la Section d'Alimentation et de la Section de Toxicologie et d'Hygiène industrielle.

Ayant entendu la lecture du rapport d'activité du Comité ad hoc pour le Génie chimique, le Comité de Division de Chimie appliquée a pris note de l'insuccès des démarches des membres du Comité pour établir une liaison active entre la Chimie et le Génie chimique. Tout en le regrettant, il a estimé que, pour l'instant, la continuation d'activité de ce Comité ad hoc ne s'imposait pas et qu'il convenait d'attendre des circonstances plus favorables, à l'occasion par exemple du Symposium de Chimie industrielle dont la tenue a été envisagée à Londres en 1967. J'ai souligné à ce propos l'intérêt tout spécial qui s'attache, pour la discipline nouvelle que représente le domaine d'activité des Ingénieurs sanitaires, à être informée, en détail, des études effectuées par différentes sections de la Division de Chimie appliquée en vue de l'établissement de méthodes analytiques permettant le contrôle physico-chimique des ambiances industrielles et de l'environnement humain en général. A cet égard, les résultats des études portant sur les limites tolérables pour les divers produits toxiques pouvant se rencontrer par exemple dans l'air des ateliers et les aliments de l'homme, y compris les eaux, conditionnent de toute évidence les critères à prendre en considération pour les installations et les processus industriels.

J'ai personnellement informé les membres du Comité des contacts pris et des actions effectuées en ce qui concerne les impératifs de liaison mentionnés dans l'introduction du présent rapport.

En ce qui concerne la liaison avec les autres Divisions, un compte-rendu de la réunion mixte tenue à Vienne les 29 et 30 octobre 1964, entre les Officiers des Comités de la Division de Chimie analytique et de la Division de Chimie appliquée a été présenté. La participation de la Division de Chimie appliquée aux travaux de la Commission sur la pureté des réactifs de laboratoire, constituée par la Division de Chimie analytique, a été approuvée à l'unanimité et les Drs J. BUSHILL et J. GAAGE ont été désignés à cet effet.

De même, la coopération de la Division de Chimie appliquée demandée par la Commission des Symboles, de la Terminologie et des Unités de mesure de la Division de Chimie physique a été jugée extrêmement souhaitable et le Prof. G.M. KLINE, Président de la Section des Matières plastiques, a été désigné comme représentant de la Division aux côtés du Président dans l' «International Committee on Nomenclature and Symbols», aux travaux duquel ont déjà accepté de participer, entre autres, les présidents des Commissions de Nomenclature, des Divisions de Chimie minérale, Chimie organique, Chimie analytique, Chimie physique et Chimie biologique.

Le Dr GAGE, Président de la Section de Toxicologie et d'Hygiène industrielle, a exprimé le souhait que les Officiers des autres sections de la Division de Chimie appliquée et des autres Divisions de l'IUPAC lui fassent parvenir des suggestions en ce qui concerne des toxiques industriels pour lesquels l'établissement de méthodes de dosage normalisées leur apparaîtrait souhaitable.

Enfin, j'ai rendu compte des recommandations présentées par la réunion des Présidents de Division tenue à Munich les 29 et 30 avril 1965.

En ce qui concerne la liaison avec d'autres organismes, j'ai présenté un compte-rendu sommaire de la 6e Réunion plénière ISO tenue à Paris du 7 au 11 octobre 1964, avec la participation, comme représentants de l'IUPAC, du Dr MORF, Secrétaire général, du Prof. SCHWAB, Président de la Division de Chimie physique, du Prof. MALISSA, Président de la Division de Chimie analytique, du Dr BUSHILL et de moi-même, comme représentants la Division de Chimie appliquée. J'ai exposé les grandes lignes du rapport rédigé par le Prof. SCHWAB à ce sujet et publié dans le Bulletin d'Information nº 20. J'ai indiqué, par ailleurs, les contacts que j'ai personnellement pris avec le Secrétariat général de l'ISO avec, comme conséquence, la réception des informations sur les réunions des Comités techniques de l'ISO et la possibilité de participation des Officiers des sections de la Division de Chimie appliquée intéressées.

Je mentionnerai, à titre d'exemple, la Réunion sur les graines et fruits oléagineux prévue à Bucarest, en septembre 1965, à laquelle participera le Prof. BOEKENOOGEN, Président de la Section des Matières grasses.

Après avoir rappelé les liaisons entretenues spécifiquement par certaines sections de la Division de Chimie appliquée avec des organisations internationales intéressées par des sujets d'étude se rattachant à leur propre domaine, par exemple

– l'«International Committee for the Unification of Methods of Sugar Analysis (ICUMSA)» dans le cas de la Section d'Alimentation (Représentant de l'ICUMSA dans la section: Dr GROSS);

– l'«International Association of Microbiological Societies (IAMS)» dans le cas de la Section des Fermentations (Représentant de l'IAMS dans la section: Académicien I. MALEK [Tchécoslovaquie]);

– l'«European Committee on Cellulose and Paper (EUCEPA)» dans le cas de la Section du Papier;

liaisons matérialisées par l'échange d'observateurs, j'ai insisté plus longuement sur le développement de liaisons avec de grands organismes inter-

nationaux pouvant intéresser plusieurs sections de la Division de Chimie appliquée et, de façon plus large, plusieurs divisions et même l'IUPAC dans son ensemble.

Il en est ainsi des liaisons avec les organisations internationales suivantes:

1° L'Organisation mondiale de la Santé et l'Organisation des Nations unies pour l'Alimentation et l'Agriculture

en ce qui concerne: a) les normes d'identité et de pureté des nombreux additifs aux aliments (antiseptiques, antioxygène, émulsifiants, stablisants, agents de maturation et de blanchiment des farines, agents d'aromatisation, édulcorants, colorants, etc.), ainsi que la caractérisation et la détermination de ces divers additifs dans les denrées alimentaires;

b) les normes d'identité et de pureté des agents dits pesticides (insecticides, fongicides, herbicides, etc.) ainsi que leur caractérisation et leur dosage, soit dans les formulations commerciales, soit dans les aliments où ils persistent sous forme de résidus pour lesquels il s'impose de fixer des tolérances à l'échelle internationale.

J'ai à ce sujet, souligné l'aide que peuvent apporter les sections d'Alimentation et des Pesticides à la Commission FAO/OMS du Codex alimentaire et à ses diverses sous-commissions, aux réunions desquelles le Dr Morf et moi-même avons, pour cette raison, estimé de notre devoir de participer à plusieurs reprises (Genève, 5–6 octobre 1964 – La Haye, 10–14 mai 1965).

2° L'Organisation internationale du Travail

en ce qui concerne la caractérisation et le dosage des toxiques industriels ou agricoles aussi bien dans les ambiances de travail que dans l'organisme même des sujets exposés, sujet auquel s'intéressent également *l'Organisation mondiale de la Santé* et le

3° Comité international d'Etude des limites tolérables pour les substances toxiques dans l'industrie,

rattaché à la *Commission permanente* et à l'Association internationale pour la Médecine du Travail, comité que j'ai actuellement l'honneur de présider et pour les travaux duquel j'ai, avec fruit, fait appel, à maintes reprises, à la collaboration de la Section de Toxicologie et d'Hygiène industrielle, notamment à l'occasion des deux Symposiums internationaux sur les limites tolérables pour les substances toxiques dans l'industrie, tenus l'un à Prague en avril 1959, l'autre à Paris en avril 1963 et auxquels l'IUPAC a accordé son patronage en association avec la Commission internationale permanente de Médecine du Travail et, dans le cas du dernier, avec l'Organisation internationale du Travail;

4° le Conseil de l'Europe

en ce qui concerne les problèmes d'analyse posés dans les domaines alimentaire, agricole et industriel, en ce qui concerne également la nomenclature des toxiques industriels et agricoles, en vue notamment de leur étiquetage avec symboles de danger et conseils de prudence;

5° la Communauté économique européenne

en ce qui concerne les mêmes problèmes et notamment ceux relatifs au contrôle des critères de pureté des additifs aux aliments pour l'étude desquels, ainsi que je l'ai indiqué dans mon introduction, la CEE a envisagé de solliciter l'aide de l'IUPAC;

6º l'Union internationale contre le Cancer (UICC)

en ce qui concerne la détection et le dosage des produits à activité cancérogène dans l'environnement humain (additifs aux aliments, pesticides, toxiques industriels, polluants de l'air, etc.);

7º le Comité européen permanent pour la Protection des populations contre les risques de toxicité à long terme (EUROTOX)

en ce qui concerne tous les problèmes de contrôle analytique posés par la mise en œuvre de moyens de prévention contre les agressions toxiques à long terme;

8º l'Union internationale des sciences de la nutrition

en ce qui concerne tous les problèmes d'analyses dans le domaine de l'alimentation.

Il convient de souligner que ces diverses organisations ont besoin, en permanence, de l'aide de l'IUPAC en ce qui concerne les problèmes de symboles, abréviations et nomenclature.

En ce qui concerne *la liaison avec l'industrie*, j'ai une fois encore, insisté sur son caractère indispensable, en notant que cette liaison s'était matérialisée dans le cadre des travaux de diverses sections de la Division de Chimie appliquée, notamment celles des matières grasses, des pesticides, de toxicologie et d'hygiène industrielle, des revêtements organiques, du papier, de la pâte à papier et du carton, des plastiques et hauts polymères.

Cette liaison avec l'industrie a été mise en avant au cours des contacts que j'ai personnellement eus, à plusieurs reprises, avec le Dr Ralph Connor (USA), Président du Comité des Activités futures de l'IUPAC. Elle impose de faire entrer dans les différentes sections de la Division, des experts de l'industrie en tant que membres titulaires, membres associés ou représentants nationaux et d'en inviter, le plus souvent possible, comme observateurs.

Dans la même optique, une large participation de la Division de Chimie appliquée au Symposium de Chimie industrielle qui doit se tenir à Londres en septembre 1967, est indispensable.

J'ai également souligné devant le Comité la liaison constante que j'ai entretenue avec le Dr Morf, Secrétaire général, qui n'a cessé de m'apporter une aide précieuse dans la réalisation de toutes les liaisons que j'ai évoquées.

Les futures activités des différentes sections ont été discutées en détail. On trouvera le reflet de ces discussions en ce qui concerne le programme d'activité, soit dans le compte-rendu de la Réunion, soit dans les rapports de chacune des sections. Je me bornerai à rappeler l'insertion active de certaines sections dans diverses réunions internationales, souvent sans implications financières pour l'IUPAC:

a) Symposium international sur les macromolécules, à Prague, en septembre 1965, avec un Colloque sur le vieillissement et la corrosion des matériaux plastiques;

b) Réunion de l'ISO, à Bucarest, sur les graines et fruits oléagineux, en septembre 1965;

c) Colloque de l'Organisation mondiale de la Santé sur les limites de variation à l'état normal des taux de plomb, de mercure et d'arsenic dans l'urine et le sang humains, à Genève, du 4 au 8 octobre 1965;

d) Symposium international sur la dissolution des pâtes à papier, à Helsinki, du 24 au 27 mai 1966, dont le patronage par l'IUPAC, en association avec l'EUCEPA, a été accepté par le Bureau lors de sa réunion de mars 1964 à Bâle;

e) Congrès FATIPEC sur les revêtements de surface, à La Haye, du 6 au 10 juin 1966;

f) Congrès des matières grasses à Budapest, du 9 au 15 octobre 1966;
g) 9e Congrès international de Microbiologie, à Moscou, en 1966;
h) Symposium sur la toxicologie analytique, à Prague, à l'occasion de la prochaine Conférence de l'IUPAC;
i) Symposium sur la protection des plantes, à Vienne, en septembre 1967;
j) Symposium sur la chimie pharmaceutique dont la tenue est envisagée à Munster (Allemagne), soit en 1967, soit au printemps de 1968.

A propos de la participation à des Symposia, j'ai rappelé qu'aucun patronage ou co-patronage ne pouvait être accordé par une section, sans une autorisation du Bureau, qu'il convient de demander 1 an ½ à 2 ans en avance, en remplissant le questionnaire établi à cet effet par le Comité des Publications.

J'ai informé les membres du Comité de l'adoption, par le Conseil, des nouveaux statuts et règlements annexes. Il a été décidé d'attendre leur publication sous la forme définitive pour élaborer les règlements internes de la Division de Chimie appliquée, en tenant compte de l'excellent rapport présenté sur ce sujet, à Montréal, par mon prédécesseur comme Président de la Division, le Dr Bushill, (cf. C.R. 21e Conférence Montréal, 2–5 août 1961, pages 176–179).

Je souligne ici que, en raison de son champ d'activité particulièrement large, la Division de Chimie appliquée possède un Comité de Division comprenant, en dehors des Officiers proprement dits; Président, Vice-Président, dernier Président, 2 Secrétaires, et des Présidents de sections,

6 membres supplémentaires (cf. C.R. Conférence de Montréal, p. 179, cf. également C.R. de la 20e Conférence, Munich, 26–29 août 1959, p. 278), dont 3 ont été élus en 1963:

– Dr Gabrielson (Suède); Prof. Patat (Allemagne); Prof. Woroschzow (URSS).

La possibilité d'élire ces membres supplémentaires permet d'étendre la représentation géographique au sein du Comité de Division, ce qui est particulièrement important dans un domaine d'activité aussi vaste que celui de la Chimie appliquée.

A la fin de la Réunion, le Dr Gallay, Vice-Président, a informé les membres du Comité de Division, du rapport qu'il avait présenté à la réunion des Présidents de Division à Munich, en avril 1965, puis, sur la demande du Secrétaire général à la Réunion du Bureau, sur l'intérêt qui s'attache à matérialiser, par des rapports périodiques de synthèse sur des sujets actuels, les relations entre les diverses branches de la Chimie au sein de l'IUPAC.

Le Comité de Division a ensuite prévu de se réunir lors de la prochaine conférence de l'IUPAC à Prague, au début de septembre 1967. Etant donnée l'importance de l'ordre du jour résultant de la présentation des rapports d'activité des 9 sections, il a exprimé le vœu de pouvoir tenir 2 réunions, en souhaitant qu'elles précèdent, non seulement les réunions du Conseil, mais encore la dernière réunion du Bureau, de manière à permettre au Président de la Division de solliciter les approbations indispensables aux désirs exprimés par les sections.

R. Truhaut, Président

VI.1 Food Section

The Food Section and its Commissions met on 1–3 July, 1965. The Food Additives Commission is under the Presidency of Prof. Alastair Frazer of the University of Birmingham and the Trace Substances Commission is under Dr. Henry Fischbach of the US Food and Drug Administration. The latter Commission is composed of two Sub-Commissions, one having

to do with the chemical detection and determination of mycotoxins, the other with the analysis of smoke and smoked foods for the presence of potentially carcinogenic constituents.

The Food Additives Commission reported the recent ratification of the appointment to its membership of Dr. Souto, of the Alfredo Lutz Institute of Sao Paolo (Brazil). A draft report was submitted containing monographs on 107 substances including the available references to their analytical determination in foods which had been collected in response to the Commission's questionnaire survey of the IUPAC member countries and from the Government Chemist in Great Britain. It was agreed that the list be drastically curtailed for further distribution among the countries with a view toward eliciting more detailed responses with respect to the estimation of food additives in foods. As a result some 17 substances or groups of substances from the categories of antimicrobial preservatives and antioxidants were chosen on the basis that

(a) they are included in the 3rd and 7th Reports of the FAO/WHO Joint Expert Committee on Food Additives;

(b) they are subject to tolerance limits requiring analytical methods for regulatory control, and

(c) an analytical method is feasible.

The curtailed list in no way implies that any substance not included is either unsuitable or unimportant for use as a food additive, or that it can not be adequately determined. The purpose of the next survey will be to establish which, if any, of the listed analytical methods are in use in the respective countries; and if different methods are used, references or brief outlines are requested. It is intended to conclude this phase of the Commission's assignment by the end of the year and to submit a draft report for publication.

Following this a list of Food Colours will be prepared for circulation among the member countries in order to elicit similar information with respect to their analytical detection and determination in foods.

The Joint FAO/WHO Expert Committee which is scheduled to meet in December 1965 will doubtless provide a further series of substances for which analytical methods in foods will be required.

On behalf of the Sub-Commission on Mycotoxins it was reported that priority was being given to the determination of the aflatoxins. A preliminary collaborative study in which 7 experienced international laboratories had analyzed 12 submitted samples of peanuts and peanut products, has already been conducted, using techniques of thin layer chromatography. The problems of sample size, extraction procedure, and chromatography were renewed by the Sub-Commission. A more detailed collaborative investigation is to be undertaken under the joint supervision of Dr. de Iongh (Netherlands) and Mr. Raymond (UK).

The Sub-Commission on Smoke Constituents has been considering whether to direct its emphasis toward the multiple estimation of all the potentially carcinogenic polycyclic aromatic compounds likely to be present in smoked foods, or to concentrate on the determination of 3, 4-benzo(a)pyrene as an indicator of the use of improper smoking procedure (e.g. the use of railroad ties or ship timber as fuel). It was agreed that, at least initially, effort be directed toward the detection of evidence of poor technique of smoking, particularly as regards smoked fish and other foods entering the channels of international trade. A collaborative study is contemplated under the supervision of Prof. Tilgner (Poland).

The Food Section has agreed to plan its next meeting for Hamburg, prior to the International Nutrition Congress in 1966.

B.L. Oser, Chairman, Food Section

VI.2 Fermentation Industries Section

Meeting held on 2 and 3 July, 1965, at the Conservatoire des Arts et Métiers, Paris

Present: Mr. R.F. Light (Chairman); Dr. C.N. Frey (Vice-Chairman); Dr. H. Suomalainen (Hon. Secretary); Mr. P. Birolaud; Mr. H.J. Bunker (recording Secretary); Prof. L. Genevois; Prof. H. Lundin; Dr. F. Parisi, Prof. H. Specht (representing Prof. B. Drews).

Apologies for absence: Dr. W.F.J. Cuthbertson, Prof. J. Guymon and Prof. H. Jørgensen.

The minutes of the previous meeting of 18 April, 1964, in London, had been previously circulated and were accepted and approved as submitted.

Survey of fermentation industries (world-wide)
Discussion of results of questionnaire

At the Section meeting held in connection with the XXIInd Conference of IUPAC in London, July 1963, it was decided that the Fermentation Industries Section would undertake a world-wide survey of the present status, the trends and the future potential of industrial fermentation, which aspects of the fermentation industries may be important in international trade and which problems might be thought essential and suitable for international co-operative work. By circulating a questionnaire to experts in different countries it was hoped to obtain an opinion of the extent of the fermentation industries, their concentration in certain fields and of their future development.

The Honorary Secretary, Dr. Suomalainen, presented to the members of the Section for review and discussion a preliminary condensed tabulation of the data in hand to date. Hitherto 40 inquiries had been sent to experts in different countries and information had been obtained from 24 countries. Points brought out during the discussion dealt with:

(1) The complete absence of any data for some countries.

(2) The absence of data for some countries due to the fact that there is a negligible amount of production by fermentation in these countries.

(3) The limited data in most countries relating to production of antibiotics, steroids and enzymes, due to the reluctance of industry to reveal production figures.

(4) The strong trend revealed by the data towards replacement of fermentation production by synthetic production where this is economically feasible.

(5) The difficulty of comparing the figures for different countries on account of the variety of units in which these figures were expressed.

This preliminary tabulation reveals the enormous economic importance of the fermentation industries. It also points out that the chemical industry can by synthetic production completely wipe out a fermentation process, as evidenced in the production of fumaric and lactic acids in the USA. On the other hand a fermentation process, because of its specificity, may replace isolation or synthetic processes, as for example with glutamic acid or steroid transformations.

Additional replies to questionnaires are expected within the next two months and a completed summary report should be available in about six months.

New projects

The Section discussed work in the fields of antibiotics, enzymes, steroid transformations, amino acids, organic acids and flavouring substances. Based on information gained in the course of the survey, the Section felt it would be very difficult to arrange co-operative efforts in any of these fields because of the reluctance of industrial firms to disclose information.

Two aspects of the fermentation industries considered to be of great enough economic importance in international trade as to warrant study by the Section are:

(1) A study for the purpose of establishing international standards for expressing alcoholic content of beverages and distilled potable spirits.

(2) Active dry baker's yeast has become an important factor in international trade. Therefore it is desirable to establish definitions and standards of performance for this product.

These two projects will form the bases for investigation by the section for the coming years.

Determination of fusel alcohols

Prof. GENEVOIS reported that due to the recent development of new and more precise techniques it is not possible to submit a valid report. Prof. GENEVOIS recommended and approved of recent publications on this subject by Dr. SUOMALAINEN, Prof. SPECHT, and others.

Fibre in yeast

Mr. BIROLAUD drew attention to the fact that the proposed adoption by the authorities of the Commission économique pour l'Europe (Economic Commission for Europe) of the method of WEENDE for estimation of cellulose in animal feed-stuffs is inapplicable for dried yeast since the method would indicate a cellulose content of 7–8% in this material, which is obviously false. The Dried Yeast Commission of the Fermentation Industries Section has found in their collaborative investigation that this method gives erroneously high results for yeast and for this reason did not adopt this method. A survey of the work has been published in "Pure and Applied Chemistry" (London) 7, 147–153 (1963).

Liaisons with other bodies

Water, Waste, and Sewage Section—Dr. SUOMALAINEN, who at the meeting of the Fermentation Industries Section in London 1963 had been appointed as associate member of the Water, Waste and Sewage Section to provide a liaison between both the sections, reported that the activity of the Water, Waste, and Sewage Section, during the past years had been rather weak. In 1964 the Section had by a circular letter made inquiries regarding methods of analyses for water and sewage used in different countries.

After that the future of the Section was discussed in a letter signed 28 May, 1965, by the Secretary of the Section, Prof. J.K. BAARS. The letter ends with an observation regarding the work of the Section "... it is impossible to have this all done by your chairman or your secretary, so it has to be a joint activity. If there are possibilities we could start a program, although we realize that it would be a rather long-term program. When, however, the greater part of the group members should not have much opportunity to do extra work in this respect, we fear that the aim, as it was formulated at the London meeting cannot be realized. In that case there should be a postponement of activities for a few years (which possibility is mentioned in the Rules and Regulations of the IUPAC)."

International Association of Microbiological Societies—It was noted that the Fermentation Industries Section at the meeting in London 1963 had designated Mr. BUNKER as their representative in the Section for Economic and Applied Microbiology of IAMS. The EAM-Council of IAMS, on the other hand, had appointed Academician MALÉK of Prague as their liaison with the Fermentation Industries Section of IUPAC, and Academician MALÉK had thus at the Section meeting in London 1964 been appointed Associate Member of the Fermentation Industries Section. These appoint-

ments are mentioned in the Minutes of the Meeting of the Fermentation Industries Section of IUPAC, July 1963 and April 1964 in London, as well as in a letter of 14 August, 1964, from the Chairman of the Section, Mr. R. F. LIGHT, to the President of the Applied Chemistry Division, Prof. R. TRUHAUT. However, these appointments have not been confirmed as yet, and response to the proposal will be appreciated.

Office international de la Vigne et du Vin—Prof. GENEVOIS reported that the Office international de la Vigne et du Vin had appointed him as liaison between this office and the Fermentation Industries Section of IUPAC. It was requested that the Office international de la Vigne et du Vin would confirm this by letter.

Food Section and Section on Toxicology and Industrial Hygiene—Dr. FREY proposed that the Fermentation Industries Section should offer co-operation with the Food Section and with the Section on Toxicology and Industrial Hygiene with respect to possible contamination by fermentation with organisms that may produce toxins, etc.

Personnel of Section

The Section noted the retirement of Mr. LIGHT as Chairman and Dr. FREY as Vice-Chairman on expiration of their terms of service.

The Section unanimously approved the appointment of Dr. H. SUOMALAINEN as Chairman and Dr. F. PARISI as Honorary Secretary for the years 1965–1969. The other Titular Members are as follows:

	term
Mr. H. J. BUNKER	1963–1967
Dr. W. F. J. CUTHBERTSON	1963–1967
Prof. H. LUNDIN	1963–1967

and subject to acceptance the following:

Dr. ASGER LANGLYKKE, the Squibb Institute for Medical Research, New Brunswick, USA, as Vice-Chairman and Titular Member 1965–1969, and

Prof. KEI ARIMA, Tokyo University, Japan, as Titular Member 1965–1969. Prof. ARIMA was recommended by the IUPAC Bureau Member, Prof. S. MIZUSHIMA as well as by other official delegates of Japan.

In addition it was agreed to invite as Associate Members:

Dr. H. PEPPLER (Chairman-Elect of the Microbial Chemistry and Technology Division of the American Chemical Society, the organizing body for the 3rd International Fermentation Symposium) and

Prof. H. SPECHT to replace Prof. DREWS, Institut für Gärungsgewerbe, Berlin, in case Prof. DREWS will retire.

Should Prof. A. LANGLYKKE or Dr. H. PEPPLER not agree to be appointed, Prof. MATALESE and Dr. WOODRUFF were suggested as other possible representatives for the United States.

Sponsorship of the 3rd International Fermentation Symposium

The organizing committee of the 3rd International Fermentation Symposium has by a letter to Mr. LIGHT, 5 June, 1965, confirmed their application for sponsorship from IUPAC and requested that the matter be presented at the meeting of the Fermentation Industries Section of IUPAC in Paris. The symposium is to be held 3–6 September 1968 at the Rutgers University in New Brunswick, New Jersey. The Chairman, Mr. LIGHT, reported that he

has forwarded the request to the President of the Applied Chemistry Section, Prof. TRUHAUT, for submission to the Bureau for approval. An informal request has already earlier been submitted to IUPAC and been approved in principle. However, the official approval should be acknowledged to the organizing committee and the date and place of the Symposium should be included in the IUPAC calender of coming events.

Next meeting

The Section planned for a meeting in Paris for the end of August or early September 1966.

R.F. LIGHT, Chairman
HEIKKI SUOMALAINEN, Hon. Secretary

VI.3 Section des Matières grasses

La Section des Matières grasses s'est réunie à Paris les 2 et 3 juillet 1965 pour discuter les résultats des essais en collaboration en 1964/65 et pour fixer des méthodes unifiées. Environ 30 personnes provenant de 8 pays ont participé à cette réunion.

Il est bon de rappeler que la Section s'occupe depuis plus de 35 ans de la standardisation des méthodes d'analyse pour les matières grasses et leurs dérivés, domaine extrêmement compliqué pour diverses raisons. Les usages diffèrent en effet selon les pays et les sections de l'industrie. C'est pourquoi les fondateurs de la Section des Matières grasses ont institué une collaboration à l'échelle internationale. D'autre part, le nombre des commissions internationales, de différentes origines, s'occupant du même domaine, ne cesse de s'accroître. Elles ont les mêmes buts, mais souvent des mobiles différents.

La plus importante organisation pour la standardisation internationale, l'ISO, a commencé de s'intéresser aux problèmes concernant les matières grasses. Elle attribue les études dans ce domaine aux institutions nationales de la Hongrie et de la Roumanie qui ne sont malheureusement pas représentées au sein de la Section et dont on doute qu'elles aient la même autorité qu'elle a auprès des organismes internationaux qui s'intéressent aux huiles et aux graisses. Grâce à l'initiative prise par le Prof. TRUHAUT, Président de la Division de Chimie appliquée, le Président de la Section des Matières grasses: Prof. BOEKENOOGEN, a participé, comme représentant de l'IUPAC à la réunion de la Sous-Commission de l'ISO pour les matières grasses, à Bucarest, en septembre 1965. Il faut souligner encore les liaisons entretenues par la Section avec diverses organisations nationales.

L'an passé, la 5e édition des méthodes unifiées est parue chez Butterworths sous l'égide de l'IUPAC. Cette édition a été bien accueillie et les méthodes adoptées font autorité dans le monde entier. Ceci devrait inciter l'Union à continuer à prodiguer son aide à la Section d'autant plus que le produit de la vente de ces méthodes recommandées par la Section des Matières grasses lui apporte des fonds.

En ce qui concerne les aspects financiers liés à l'activité de la Section, il faut souligner l'aide relativement minime demandée à l'IUPAC puisque, grâce à l'organisation néerlandaise TNO, le Secrétaire peut effectuer ses tâches relativement lourdes sans rémunération. La subvention annuelle demandée est de 800 $: 400 $ pour la reproduction des documents de la section: programme de travail annuel, comptes-rendus, descriptions des méthodes pour les essais effectués, en collaboration et résultats de ceux-ci; 400 $ pour les frais d'envoi de documents et d'échantillons à analyser (frais assez élevés en raison de la diversité des lieux où travaillent les membres

de la Section). Tous les membres font leurs analyses et leurs essais sans frais pour l'IUPAC et leurs efforts tendent à l'unification des méthodes de la lipochimie, ce qui intéresse non seulement l'industrie elle-même, mais au premier chef le contrôle international des matériaux qui jouent un grand rôle pour la santé publique. — L'état actuel des travaux est le suivant:

1° Modifications dans la composition de la Section qui seront communiquées ultérieurement par le Secrétaire, ainsi que la liste des participants à la dernière réunion.

2° Cinq méthodes nouvelles approuvées ont été transmises à l'éditeur et six autres suivront sous peu.

3° Lors de la réunion de Paris, les méthodes suivantes ont été approuvées:
- a) de détermination des pieds dans l'huile de lin
- b) de détermination de la dilatation des graisses
- c) de détermination de la courbe de solidification des graisses

4° Pour l'année prochaine, les études suivantes seront poursuivies:
- a) sur la détection du cholestérol – comme indicateur des graisses animales – dans les huiles végétales
- b) sur la séparation des tri-, di- et mono-glycérides par chromatographie sur colonne
- c) sur le point de fusion nommé «slip-point»

5° Comme nouveaux sujets seront étudiés:
- a) le dosage de l'arsenic dans la glycérine
- b) le dosage des groupes époxy dans les huiles
- c) la détermination de l'indice de Kirschner pour évaluer la teneur en graisse du beurre

La prochaine réunion de la Section aura lieu en septembre 1966 à Dublin (Irlande), sur invitation amicale de nos membres irlandais, sans frais pour l'IUPAC.

H. A. Boekenoogen, Président de la Section

VI.5 Toxicology and Industrial Hygiene Section

The Section held meetings on 2–3 July; 6 Titular Members and 1 Associate Member were present, and also a representative from the World Health Organization.

The drafts of the methods for trichlorethylene, acetone and mercury in air were finally approved for publication. A further draft of the method for arsenic in urine will be circulated for approval.

After a further discussion of the subjects which were on the programme from the previous meeting, methods for lead and cadmium dusts, sulphur dioxide and hydrogen selenide in air were approved in principle and drafts of these methods will be circulated. Further work will be necessary on methods for total acid vapours, hydrochloric acid, sulphuric acid, hydrofluoric acid, methyl bromide and benzene in air. Methods for phosphine and ozone, which had not been previously discussed by the Section, were considered and selected methods will be subjected to tests.

Threshold limits for lead, arsenic and mercury in urine were discussed and while it was agreed that the Section could not make any definitive statement on this subject, tentative values of 0.15 mg/l for lead and 1.0 mg/l for arsenic in urine were suggested so that progress could be made in establishing analytical methods. It was agreed that the excretion arising from the diet and other non-occupational origins should not influence the magnitude

of the industrial thresholds, but the Section is interested in "normal" values and will collaborate in the work to be undertaken in this field by a committee of the World Health Organization. Methods for lead, mercury and trichloro-compounds in urine were adopted and final drafts will be circulated before publication. Methods for phenols in urine and carbon monoxide and benzene in blood were discussed and further work will be necessary before a draft can be prepared.

Discussions were started on a method for blood cholinesterase activity. Only two of the members had direct experience of such methods and there were certain differences of opinion between expert advisers. It is hoped to bring these advisers together so as to resolve the difficulties. Methods for carbon monoxide, trichloroethylene, carbon disulphide and acetone in exhaled air were also discussed and as a first step we shall investigate the possibility of modifying for this purpose methods of air analysis already adapted.

The section will collaborate in a survey to be undertaken in the United States on the reliability of indicator tubes for air analysis.

The titular memberships of Dr. Gage, Dr. Pietrulla and Prof. Kitagawa are now terminated, but Prof. Truhaut will approach the Bureau to ascertain whether some of these may be extended. Dr. Metrico of Italy and Dr. Vasak of Czechoslovakia have been proposed to fill vacancies.

The next meeting will take place in Prague in 1967 and the Section will take part in a Symposium on Toxicology to be organized by the Czech National Committee.

VI.6 Pesticides Section

Paris, 1 July 1965

The Pesticides Section held three meetings in Paris as part of the 1965, XXIIIrd IUPAC Conference. The meeting on 1 July was a closed session, restricted to the Titular Members. The main business discussed was:

(a) membership, precipitated by Dr. Treboux's decision to step down as Chairman of the Section;

(b) the Working Paper prepared by the Secretary, Dr. H. Hurtig, on "Proposed IUPAC Commission on Pesticide Residue Chemistry".

Membership

Dr. Treboux regretted that, due to the pressure of his work and the changing nature of emphasis on programme of this Section, he felt obliged to turn over the chairmanship to someone else. The meeting reluctantly agreed to Dr. Treboux's request and was assured that he would continue to serve as a Titular Member.

Dr. H. Hurtig was elected Chairman, and Dr. C. Resnick Secretary.

The period of membership of some other Titular Members was also reviewed.

The meeting agreed to fill the position for an eighth Titular Member as soon as authorization can be obtained. The person to be elected has been chosen with agreement that he will also serve as the Secretary of the two new Commissions which were proposed to the Council.

Proposed IUPAC Commissions on Pesticide Residue Chemistry
Summary

(1) Approval is to be requested from the IUPAC Council for the creation of two IUPAC Commissions on Pesticide Residue Analysis. The organizational plan proposed will be:

Division VI Applied Chemistry

Section VI.6 Pesticides

VI.6.1 Commission on Development, Improvement and Standardization of Methods of Pesticide Residue Analysis

VI.6.2 Commission on Chemical Nature of Terminal Residues.

(2) The first priorities will be assigned to recommendations received by the IUPAC Pesticides Section from the FAO Working Party on Pesticide Residues as the result of the FAO Working Party evaluation of information pertaining to pesticide residues, tolerances and methods of analysis (including recommendations from the joint FAO/WHO Meetings on pesticide residues). In 1965 the FAO Working Party submitted its first set of recommendations to IUPAC for assignment of priority in programme to:

(a) needs for development of methods of analysis for certain pesticide residues *in cereals;*
(b) needs for information on residues of dithiocarbamate fungicides.

(3) Other priorities have been defined by the Titular Members of the IUPAC Pesticides Section. In the future this Section of IUPAC will be pleased to receive recommendations from any responsible source if documented in full.

(4) The IUPAC Pesticides Section solicits the active co-operation of existing national and international scientific agencies, country associations and the pesticide industry in the development and execution of the programme of the Commission. This plan proposes that these responsible bodies should also assist in nominating panels of active research workers to participate in the execution of specific segments of programme and collaborate in obtaining assessments of recommended methods of analysis in regulatory type laboratories.

Historical

(1) In 1964 Prof. R. Truhaut, the President of the Applied Chemistry Division of IUPAC, drew the attention of the Chairman of the Pesticides Section to the requirements of the various FAO/WHO programmes on pesticides for certain services in the field of pesticide chemistry.

(2) The 1964 meeting of the Titular Members of the Pesticide Section of IUPAC was held in Rome in October. The President of the Applied Chemistry Division of IUPAC also attended in order to offer his advice on why and how the new programme for the Pesticide Section should be developed. The conclusion of the meeting was that:

(a) this Section of IUPAC should develop a programme of pesticide residue chemistry to serve the needs now being defined by the FAO/WHO programmes concerned with pesticide residues;
(b) the programme should at present be confined to pesticide residue chemistry and *not* be extended to analysis of bulk quantities of pesticides or specific factors for their formulation.

(3) This decision was communicated to FAO through Dr. Lee Ling, Director, Crop Protection Branch of FAO. In November 1964, Dr. Lee Ling informed the Secretary of the Pesticides Section of IUPAC that FAO would be pleased to have the assistance of IUPAC in meeting the requirements of FAO in pesticide chemistry. Similarly, an earlier joint FAO/WHO meeting on the toxicological aspects of pesticide residues, held in 1963, recommended that

IUPAC also attempt to meet its needs for information on the chemical nature of terminal residues of pesticides.

(4) The plan suggested to FAO and WHO is that the two main groups of experts concerned with these subjects (the joint FAO/WHO committees on evaluation of hazard of residues in food, and the FAO Working Party on Pesticide Residues) should define their needs and assign priorities to problems to be passed on to the Pesticides Section of IUPAC.

(5) *Priorities – FAO.*—The FAO Working Party on Pesticide Residues met in Rome from 17–29 May, 1965, to evaluate information on residues of pesticides in cereals. As the result of this evaluation, a series of requirements and recommendations have been passed to the Pesticide Section of IUPAC. They are outlined in brief below. Full details will be published in the forthcoming Report of the 1965 meeting of this FAO Working Party on Pesticide Residues. (Full information was available to the Pesticides Section on the detail of these requirements, as described by the FAO Working Party on Pesticide Residues.)

(6) *Recommendation 1: Organophosphorus compounds.*—Development of more sensitive methods of residue analysis *in cereals* for dimethoate, demeton, demeton-S-methyl sulfoxide, diazinon, parathion and parathion-methyl, with special reference to the use of multi-detection systems.

(7) *Recommendation 2: Toxaphene and "Strobane".*—Develop specific methods of analysis for toxaphene and Strobane residues *in cereals* with special reference to: (a) sensitivity, (b) in present multidetection systems, residues of these compounds interfere with the identification of residues of other pesticides.

(8) *Recommendation 3: Cyclodiene residues in cereals.*—Develop and apply multi-detection systems to the determination of cyclodiene residues in cereals with special reference to clean-up procedures applicable to *all types of cereals* (e.g., corn, wheat, oats, barley, soybean, rice, etc.).

(9) *Recommendation 4: Halogenated fumigants.*—Develop specific and sensitive methods for the separate determination of halogenated fumigants in unchanged form in cereals with special reference to developments in gas-liquid chromatography and to the possibility that these methods may also be extended to other cereal fumigants (e.g., acrylonitrile, CS_2, ethylene oxide and phosphine). Standardization of commercially available indicator tubes is also required.

(10) *Recommendation 5: Radiochemical techniques.*—The FAO Working Party on Pesticide Residues considers that, while they can be of value in research, the development of radiochemical techniques for regulatory methods of pesticide residue analysis is not justified.

(11) *Recommendation 6: Dithiocarbamate fungicide residues.*—The FAO Working Party on Pesticide Residues recommends the compilation and evaluation of information on the present state of knowledge of dithiocarbamate fungicides with respect to:

(a) chemical nature of their terminal residues;
(b) their metabolism and degradation with special reference to defining the need for new analytical methods.

Priorities—Titular Members of IUPAC Pesticides Section

(12) At its 1964 Meeting in Rome, the Titular Members of the IUPAC Pesticides Section agreed to anticipate needs for programme on pesticide residue analysis extending beyond those that might be defined in 1965 by FAO. This decision was based on advance knowledge of the fact that the

FAO Working Party would be concerned with residues in cereals in 1965 and possibly for the next few years also. One set of recommendations for inclusion in the programme of the proposed Commission was received on the date of preparation of this Working Paper. These recommendations are summarized in an Appendix; full documentation on each recommendation has been deposited with the Secretary.

Execution of Programme of Work

(13) The IUPAC Pesticides Section is aware that several national and international organizations and agencies already have programmes of work in progress on the development and standardization of methods of detecting and measuring pesticide residues in food, water, the environment in general and certain substrates in particular. This Section of IUPAC has no desire or ambition to interfere with these programmes, since it is believed that they have been established to meet the immediate needs of the agencies so involved. As pointed out in the preamble, the immediate goal of the IUPAC programme on pesticide residues analysis is to serve the needs of FAO in this subject as quickly as possible and in such a fashion that it will also provide a useful service to the FAO/WHO expert programmes on pesticide residues and the needs of the Codex Alimentarius Commission Committee on Pesticide Residues. Indeed, several of the Titular Members of the IUPAC Pesticides Section are also members of these FAO/WHO groups and others are drawn from the membership of the various national and international associations which have avowed an interest in methods of pesticide residue analysis. In addition, a number of Titular Members are constantly drawn from the world's pesticide industries. It is recognized that these industries have made major contributions to the advancement of knowledge in this subject and will be able to support the proposed programme of this IUPAC Section in a tangible manner.

(14) Each problem as defined will be assigned to a *temporary* working party of active research workers for the development of a collaborative approach. It is recognized that a small research and development team, made up of the best scientists available with special knowledge and interest in the problem, can produce results faster than large unwieldy groups. Each qualified, existing national and international association, governments, universities, and the pesticide industry will be invited to determine the interest of its members in specific problems and nominate panels of research workers. The IUPAC Commission on Pesticide Residue Analysis will select the members of the *temporary* working party for the particular problem.

(15) The resulting method of analysis or evaluation of information will be circulated to national or international scientific associations, governments or those segments of the pesticide industry which have expressed interest to the IUPAC Pesticide Section on the particular problem. Comments will be solicited and evaluated.

(16) If the problem involves the development of a particular method of analysis in a particular substrate for regulatory purposes, the recommended method developed by the working party will be submitted for field testing, under practical conditions, to a group of laboratories involved in regulatory type work. The interested participants in the IUPAC special meeting in Paris on 2 July, 1965, can provide a useful service in the future by nominating laboratories and chemists with special interest in participating in this step of methods evaluation.

(17) Results of these actions will be reviewed by the IUPAC Commission on Pesticide Residue Chemistry and then forwarded by the IUPAC Pesti-

cides Section to the agency originating the request to initiate work on the problem. The Pesticides Section of IUPAC hopes that arrangements can be made to publish the results of the work of the commission quickly in the IUPAC Journal, provided no other acceptable means of publication are requested by the temporary working parties.

(18) At the present time most of the avowed interest in these problems originates in Europe, North America and Japan. IUPAC is a world association of chemists which is not restricted by geographical or political considerations. The avowed interest of the Pesticide Section of IUPAC is to assist in the development of capacity to conduct research on these problems in other parts of the world. In order to achieve this, the Titular Members of the IUPAC Pesticides Section will continue to be drawn from, and seek support from, as wide a geographical distribution as possible. The same policy will be maintained in developing the programme of the Commission. Equal emphasis will be given to the status of participants in the scientific community.

The Meeting adopted this proposal. The Chairman was instructed to forward the request for authority to establish the two Commissions to the Division of Applied Chemistry for presentation to the Council.

In addition to the priorities recommended to this Section by FAO, additional documentation was submitted to the Titular Members by Dr. R. A. E. Galley on the need for a IUPAC programme of work on:

(a) The positive identification and analysis of chlorinated pesticides in human and animal fats and tissues.

(b) The positive identification and analysis of chlorinated pesticides in birds' eggs.

Suggestions (a) and (b) are supported by original current work and procedures described by: Kovacs (JAOAC, 1963, *46*, 884); Mills (JAOAC, 1963, *46*, 186); Richardson (TU/21/46 Publications in press); De Faubert Maunder *et al.* (Analyst, 1964, *89*, 168); Robinson and Richardson (Chem. and Ind. 1963, 1460).

(c) The positive identification and analysis of Vapona in human diets (excluding milk and milk products).

This is based on Tunstall Laboratory (Shell) work together with procedures described by: Hughes (Analyst, 1963, *88*, 318); Sun and Johnson (JAOAC, 1963, *46*, 524); WAMS 30–1 and WAMS 32–1.

(d) The analysis of DDT and its metabolites in crops.

This suggestion is based on Tunstall (Shell) work and work described by: De Faubert Maunder *et al.* (Analyst, 1964, *89*, 168); Burke and Holswade (JAOAC, 1964, *47*, 845); Burke and Guiffrida (JAOAC, 1964, *47*, 826); Kovacs (JAOAC, 1963, *46*, 884); Mills (JAOAC, 1959, *42*, 734).

(e) The positive identification and analysis of chlorinated pesticides in human diets (excluding milk and milk products).

This is based on current research at Sittingbourne and work described by: Mills, Olney and Gaither (JAOAC, 1963, *46*, 186); Kovacs (JAOAC, 1963, *46*, 884); Goodwin, Goulden and Reynolds (Analyst, 1961, 697); Burke and Guiffrida (JAOAC, 1964, *47*, 326).

Dr. C. Resnick acquainted the Section with the scientific and political problems surrounding diphenyl as a post-harvest treatment on citrus. One critical problem to be resolved is agreement on the method of sampling and analysis of residues in the importing country. Dr. Resnick agreed to circulate documentation on methods of analysis to the Titular Members.

Paris, 2 July, 1965

A special open meeting of the Pesticides Section was convened in Paris on 2 July in order to discuss the proposed new programme of this Section with invited representatives of those several international organizations with an avowed interest in the *chemistry of pesticide residues.*

In addition to the Titular Members the following were present: Dr. W.F. Darke, European and Mediterranean Plant Protection Organization (Paris); Dr. F.C. Lu, World Health Organization (Geneva); Dr. F.W. Whittemore, Food and Agriculture Organization (Rome); Dr. F. Bro-Rasmussen, Scandinavian Committee on Food Analysis (Copenhagen); Dr. W.F. Almeida, Biological Institute (São Paulo, Brazil, as observer); Dr. H. Egan, Analytical Panel of the UK Advisory Committee on Pesticides and other Toxic Substances (London); Dr. C. Viel, European Commission on Phytopharmacy (Versailles); Dr. S. Ventura, European Economic Community (Brussels), assisted by Dr. S. Dormal-van den Bruel; Prof. R. Truhaut, as President of Applied Chemistry Division of IUPAC and as spokesman for the Council of Europe; Dr. H. Frehse, (Germany), representative of the Groupement européen des fabricants de pesticides, GEFAP.

Invitations were also issued to Dr. Franck as Chairman of the FAO/WHO Codex Alimentarius Committee on Methods of Analysis, the Central Service for International Co-operation for Scientific Research of OECD (Paris) and Dr. V. Beneš (COMECON), Prague, but they were unable to attend. (Dr. Beneš has indicated the interest of the COMECON Committee in collaborating with this Section in the programme which might be developed.) The International Union for the Conservation of Nature was also invited, but did not attend.

Dr. H. Hurtig acted as Chairman of this special meeting. He informed the meeting of the Section's decisions regarding the problems surrounding the current status of the chemistry of pesticide residues, and of the Section's request to the IUPAC Council to create the two new IUPAC Commissions to cope with current needs in this field. Copies of the Working Paper were circulated as a basis for discussion. The Chairman explained the nature and scope of the intended work, emphasizing that *initial priorities will be determined by the requirements defined by FAO and WHO.*

Prof. Truhaut stressed that IUPAC does not desire to interfere with the work of other international organizations, but hopes to coordinate the work to avoid undesirable overlap or duplication of effort, and to provide communication between the available specialists. In addition to the priorities outlined by the FAO Working Party on Pesticide Residues, Prof. Truhaut summarized the needs for information on the metabolism and degradation of residues that would lead up to the clarification of the chemical nature of terminal residues. He reviewed the results of two evaluations of available information made by the Joint Meetings of the FAO Committee on Pesticides in Agriculture and the WHO Expert Committee on Pesticide Residues, held in 1963 and 1965. Information is required on the chemistry of residues as follows:

chlordane:	the technical product and the residues
endosulfan:	chemical nature of terminal residues
chlorthion:	nature of metabolites in plants
diazinon:	clarification of the chemical nature of metabolites and their toxicity
azinphos-methyl:	study of metabolism in plants and animals
propham and chloropropham:	biochemistry
carbaryl:	chemical nature of metabolites in plants
captan:	chemical nature of residues in plants

dithiocarbamate fungicides: Ferbam, Maneb, Zineb, Ziram, etc.
Information is required on the chemical nature of the terminal residues in and on plants. Methods of analysis are required for residues in food

Prof. TRUHAUT also spoke as the representative of the *Council of Europe*.

The Council of Europe has a subcommittee on poisonous substances in agriculture, working, inter alia, on the control of residues in human food and on the toxicity of compounds used in agriculture as pesticides. The analytical methods used in such a control programme must come from IUPAC and EPPO. The Council of Europe will not carry out this work itself, but would like to receive the necessary information from the international bodies engaged in development of methods.

Dr. WHITTEMORE introduced the problems and priorities as viewed by FAO. He reviewed these requirements as presented in the Working Paper and elaborated on the report of the FAO Working Party on Pesticide Residues. It was necessary to clarify the meaning of such terms as "*terminal residues*" as applied to raw agricultural commodities moving in international trade *v.* food as offered for human consumption.

Dr. LU of WHO explained that his organization is primarily concerned with the assessment of the toxicity of residues, the parent pesticide and its metabolites, and expressed hope that chemical industry will assist in providing much of the required information. WHO hopes to coordinate and sponsor research on the toxicological problems. Financial support for such research projects is still a serious unsolved problem, since no provision has been made in WHO's budget for 1966. Work should be effectively coordinated, and priorities established. Dr. LU dealt briefly with how information on metabolism will affect priorities. Those which metabolize completely and are excreted as opposed to those which are only partially metabolized and/or stored in the body.

At this point the *Chairman* asked Dr. LU to clarify an important point that will become a guiding rule for future programmes on development of analytical methods. "What is an *insignificant amount of residue* for a compound for which no acceptable daily intake has been recommended?"

Dr. LU in replying indicated that he was aware that great refinements and lowering of limits of detection of residues have been achieved in the past few years. He agreed that the burden now shifts to the toxicologist to provide clarification of the goals to be set in analytical programmes. The problem raised by Dr. HURTIG indeed requires very careful study. WHO intends to convene a meeting of experts to discuss this very point. Dr. LU also expressed the opinion that the Codex Alimentarius Commission will also review methods of analysis that might be submitted by IUPAC's Pesticides Section for adoption by the Codex Alimentarius.

The *Chairman* requested that both FAO and WHO ensure that, when a method of analysis is being requested, it should be clearly stated whether the method is for application in raw food moving in international commerce, or on food offered for immediate consumption in that state by the consumer.

Dr. FREHSE, speaking on behalf on the Western European pesticide industry (GEFAP), pointed out that there is considerable confusion surrounding some of the terms now being used, and in translation from one language to another. In particular, reference was made to the requirement to define "*terminal residue*". Dr. FREHSE asked who was going to actually conduct new research that would be indicated by some of the priorities outlined. In the ensuing discussion, Dr. WHITTEMORE announced that

there is a possibility of appointing a Pesticides Information Officer at FAO for collecting information on pesticides chemistry, residues, metabolism, etc., and build up an information system on these subjects.

A lively discussion of the questions raised by Dr. FREHSE resulted in an agreement from all those present that there is great urgency in having the toxicologists and chemists work together in defining needs for information and in evaluating information pertaining to pesticide residues. This group hoped that WHO would convene a joint meeting of experts as soon as possible, including chemists, toxicologists and pharmacologists. Dr. LU stated that this suggestion would be considered favorably by WHO in its current planning.

Mr. COOK (USA) explained to the meeting the procedures now in use by the Association of Official Agricultural Chemists (AOAC) in developing and standardizing methods of analysis *(Mr. COOK was officially designated by AOAC as its spokesman at this meeting.)* Specific methods are preferred over general ones (e.g.—total chlorine, total phosphorus, etc., are of little value as official methods). The AOAC will tend to change as quickly as possible to specific methods as soon as they become available. The AOAC will evaluate and consider the suitability for adoption of methods developed outside the USA and Canada, such as the EPPO methods.

Dr. H. EGAN presented further notes on current work of the British Panel on Residue Analysis, supplementary to the written report circulated to this Meeting. The British Panel is part of the EPPO effort in developing standard methods for adoption.

Dr. W.F. DARKE explained the aims and work programme of EPPO. There are 31 members nominated by the official Plant Protection Services of the member countries. EPPO has no direct liaison with the pesticide industry, EPPO is primarily concerned with the prevention of the spread of insect pests and diseases in Agriculture. It is not concerned with the toxicology of pesticides, but it does have a special Panel concerned with methods of analysis for residues. EPPO does not intend to embark on a concerted effort on the subject of residues or the related problems. The plan of work put forward by the IUPAC Pesticides Section is of great interest, but he would be especially interested in a study of the residues resulting in glasshouses as compared to those obtained in the open field. Dr. DARKE noted that some of the Eastern member countries of EPPO, due to financial and political problems use chemicals that may not be common in western Europe. This created a difficulty as the eastern European countries insist that every member country of EPPO approve the method before it can become general.

Dr. HURTIG indicated that the Pesticides Section of IUPAC was assured of the interest and possibly future participation in the IUPAC Pesticides programme by the COMECON Committee of five eastern European countries, and hoped that this group's experiences with EPPO would be an inducement for the development of more collaborative efforts with IUPAC.

Dr. BRO-RASMUSSEN briefly reviewed the work of the Scandinavian Committee on Food Analysis, and its aims in establishing analytical methods for adoption by control laboratories. The Chairman and the Secretary General are selected from National Committees. Members of the Scandinavian Committee are appointed by the respective governments. The objective is to cover all aspects of analytical problems in food and establish methods for use in public control laboratories. The choice of analytical method is fashioned after the AOAC's referee system. Normally, National Committees will recommend a method, then at least one laboratory from each country (6 to 10 laboratories) will be involved in evaluating the proposed method. When an agreed method is adopted, it is published in two Scandinavian languages plus an English translation.

This programme began in 1958. At present, five or six laboratories are actively engaged in pesticide residue work. In the Danish National Committee's laboratory, some work has been done on the comparison of the various methods of analysis for DDT residues (chemical, EPPO method, GLC method).

Dr. S. DORMAL-VAN DEN BRUEL, speaking on behalf of EEC, outlined that organization's interests and needs on methods of analysis and tolerances for residues. No toxicological work is carried out by the EEC and it will rely upon the recommendations of the FAO/WHO Expert Committees. Collaborative work is carried out toward the adoption of agreed analytical methods (by member countries of EEC). Work is currently in progress on methods for the analysis of residues on fruits of: malathion, lindane, demeton-methyl, carbaryl, captan. Dr. DORMAL-VAN DEN BRUEL stated that no tolerances will be established by the Common Market unless there is an agreed method of analysis available for the residue, applicable in the range of sensitivity of the tolerance. The method must also be adoptable for at least two types of fruits and two types of vegetables.

The Chairman, in summing up the results of the meeting, was pleased to note that none of the organizations represented had expressed opposition to the IUPAC proposed plan to coordinate these activities. Dr. HURTIG warned that one cannot freeze analytical methods, but, in the interests of international commerce and to ensure the free movement of food, at a given point in time there must be official methods adopted at this level, as long as there is an awareness that they may be replaced at a later date. He reiterated that the IUPAC Pesticides Section will support all collaborative work on the analysis of pesticide residues and the chemistry of pesticides in order to promote understanding and agreement in this field.

In forecasting how the working teams might be developed to service each problem, Dr. HURTIG pointed out that IUPAC's main interest would be to obtain the services of the most capable chemists on each problem regardless of their affiliations. It was noted that many of the official government and intergovernmental agencies represented at this special meeting restricted their membership to scientists and officials in the government services. Many capable pesticide residue chemists are located in the laboratories of the pesticide industry, universities and other laboratories. It is the intention of the Pesticide Section to utilize this talent as well as that available from official circles.

The *Chairman* expressed the appreciation of the Pesticide Section to those attending the meeting and hoped that the interested organizations would be actively associated with the programme as it develops.

Paris, 3 July, 1965

A closed meeting of Titular Members was convened to consider the results of the meeting of 2 July and develop other recommendations to be made to the Applied Chemistry Division and the Council.

The following decisions were made:

(1) The Pesticides Section formally requests the Division of Applied Chemistry to request authorization from the IUPAC Council for the establishment of the two Commissions on pesticide chemistry outlined in the Working Paper.

(2) Confirmation was made of the nomination of a prospective eighth Titular Member, who would also act as Secretary of the two new Commissions. The meeting was unanimous in its choice of the prospective nominee. After determining his willingness to serve and informally exploring his acceptability

to the national adhering body concerned, the nomination will be forwarded to Dr. MORF via Prof. TRUHAUT.

(3) In discussing the administration of the work of the two Commissions, the Section members were in agreement that each problem accepted would be of short-term nature and should be solved by an *ad hoc* team of specialists. These specialists would not have to be members of the Section or the Commissions. However, it might be possible to grant associate membership at *no expense* to IUPAC to some of these specialists. It was pointed out that IUPAC had no funds to support travel expenses to meetings for associate members or the other specialists asked to work on *ad hoc* working parties.

Since the problem of funds appears to be an acute one, the meeting agreed that, in the initial stages, the full members of the two new commissions would be drawn from the present Titular Members (including the new eighth Titular Member) and that meetings of the Commissions would be held as extensions of the annual meetings. In some cases, Associate Members might be able to attend at the expense of their interested employers.

(4) Prof. Dr. BERAN, Chairman of the Austrian organizing committee for the *VIth Pesticides Congress* (to be held in Vienna in 1967) was unable to attend these meetings in Paris. His report on preparations and planning to date was presented to the meeting by the Chairman. As the result of pressure from western European plant protection organizations, the Austrian organizing committee has reaffirmed its intention to call this congress the VIth Plant Protection Congress. The Section discussed the skeleton scientific programme presented by Prof. BERAN and made suggestions on modification of the proposed information bulletin. Policy decisions on the organization of the VIIth Pesticides Congress in 1970 were developed on the basis of these experiences with the Vth Congress and the forthcoming VIth Congress. Also, it was apparent that there is a much more formal requirement for clearing these plans with the Council before proceeding as far as has been the case with the VIth Congress.

(5) The VIth Congress in Vienna will be held on 30 August to 6 September, 1967. Plans available to this Section for the 1967 IUPAC Congress in Prague were not far enough advanced to allow forecasting of how these dates might overlap. This Section has asked the Council for approval to hold its *1967 Meeting* in conjunction with the VIth Plant Protection Congress in Vienna. The meetings of Commissions VI.1 and VI.2 will take place either immediately prior to the Vienna Congress or immediately afterwards.

(6) *The 1966 Meeting of the Pesticides Section and Commissions VI.1 and VI.2* can be conducted most effectively if it is possible to hold the next meeting as soon as possible after the meetings in 1966 of the FAO and WHO expert committees and working parties which will define further requirements on the chemistry of pesticide residues. The next joint meetings of the FAO/WHO groups concerned with "acceptable daily intakes" will be held in Geneva in the fall of 1966. It is possible that the FAO Working Party on Pesticide Residues may convene in Rome in consecutive weeks. If so, it will be desirable to convene the 1966 Meeting of the Pesticides Section and Commissions VI.1 and VI.2 immediately afterwards at either Geneva or Rome, whichever is most suitable to FAO or WHO in providing a meeting place.

(7) In order to anticipate an early start on the problems outlined for priority by FAO and WHO, the Titular Members of this Section are to submit their priorities to the Secretary within six months of this meeting. Full documentation is required on any new priorities, including a review of the status of current methods and new developments in analytical procedures that would lead to the development of acceptable methods. The first *ad hoc*

working parties of the two Commissions will be established on the priorities submitted by FAO and WHO. The Members of Section were reminded that they were to nominate participating scientists and laboratories for the priorities outlined by FAO. These nominations should be forwarded to the Secretary as soon as possible.

(8) Details of proposed *budgets* for 1966 and 1967 were forwarded to Prof. TRUHAUT on 7 July, 1965. It was pointed out that no provision was made for administrative expenses in 1966, but we see these as unavoidable in the future.

VI.7 Plastics and High Polymers Section

Report of Meetings in Paris, 2 and 3 July, 1965

Present: Dr. G.M. KLINE, Chairman (United States); Dr. A.F. MCKAY, Secretary (Canada); Dr. J.W. BARRETT (UK); Dr. J.W. BREDT (Netherlands); Mr. G. DRING (UK); Dr. P. DUBOIS (France); Mr. A. GROSS (France); Dr. O. LEUCHS (Germany); Mr. M. RODEYNS (Belgium); Prof. Dr.-Ing. S. WINTERGERST (Germany).

Visitor: Dr. C.O. GABRIELSON (Sweden).

Excused: Ing. B. DOLEZEL, Dr. F. ECOCHARD, Dr. J. HEIJBOER, Dr. K.H. HELLWEGE, Dr. S.N. NAMETKIN, Dr. G. DE SENARCLENS, Dr. J.J.P. STAUDINGER, Dr. L. MARTIN VICENTE, Dr. T. WISNIEWSKI and Dr. W. ZATTAR.

The meeting was called to order and members were welcomed by Dr. G.M. KLINE, Chairman. Dr. WINTERGERST, the recently elected Titular member from Germany, was introduced to the members and welcomed as a member of the Plastics and High Polymers Section.

Minutes of the Milan meeting

Copies of the Minutes of the Milan meeting, which convened 21 September, 1964, were available for reference. The Minutes of this non-official meeting were accepted without change.

Future meetings

The XXIVth Conference of the International Union of Pure and Applied Chemistry will be held in Prague, Czechoslovakia, from 28 August to 13 September, 1967.

The 2nd European Conference on Plastics and Rubber will be held in Paris at the Conservatoire national des Arts et Métiers from 20–27 May, 1966, in conjunction with the European Plastics Exposition. Papers will be presented in French, German or English with simultaneous translation into the other two languages. A provisional programme for this conference includes the application of plastics in the building, automotive, agricultural and electrical industries. It also covers macromolecular chemistry, plastic foams, rubber, reinforced plastics, rheology, equipment, methods and European quality control standards. Dr. KLINE agreed to request permission from IUPAC Bureau for the Plastics and High Polymers Section to participate as co-sponsors of this Conference without IUPAC financial obligation of subvention. (Notice has been received recently from the IUPAC Bureau that this request has been refused on the basis of the two-year advance notice rule—Note by Secretary.)

It was agreed that a meeting of the Plastics and High Polymers Section would be held in Paris at a convenient time between 20 and 27 May, 1966, at no cost to IUPAC.

It is hoped that an Industrial Chemistry Conference under the auspices of IUPAC will be held in England immediately following the Congress in Prague. The following themes have been proposed: Petroleum Processes, Industrial Organic Chemistry and Industrial Polymer Science.

Macromolecular Commission

The International Symposium on Macromolecular Chemistry is being held in Prague from 30 August—4 September, 1965. In 1966, the International Symposium on Macromolecular Chemistry will be held in Tokyo, Japan, from 28 September to 4 October.

Classification of High Polymers

Dr. LEUCHS distributed the final section of the report on the Classification of High Polymers.

Dr. MORF had agreed that the IUPAC would sponsor the publication of the German text. However, he indicated that translation of this text into English could not proceed under the auspices of IUPAC due to the length of the report.

Mr. DRING agreed to contact English colleagues to ascertain their willingness to assume responsibility for the English translation.

Members having questions or comments on this report should correspond directly with Dr. LEUCHS.

The Chairman thanked Dr. LEUCHS for the time and effort he put into his report and congratulated him on the results.

Standard Abbreviations

Dr. KLINE's report on Standard Abbreviations prompted lively discussion. Attention was called to several proposed changes including the deletion of the abbreviation DNODP, addition of a note in Appendix I to cover copolymers, substitution of PDAP for DAP as abbreviation for polydiallyl phthalate, etc.

Mr. DRING proposed that the revised report be forwarded to the IUPAC Bureau for approval for publication. Proposal seconded by Mr. DUBOIS and approved unanimously.

ISO/TC61

Mr. DRING reported on his attendance at the meeting of ISO/TC61 in Budapest, 5–10 October, 1964, as liaison representative from this Section. One hundred and fifty-one delegates and observers attended the meeting and the ten working groups all reported progress.

Future meetings are to be held in Bucharest in 1965, Sweden in 1966, undecided in 1967 and the United States in 1968. Dr. KLINE will represent the Plastics and High Polymers Section at the Bucharest meeting 13–19 September, 1965.

The work of WG 9 on specifications is of particular interest to this Section. Specifications are being prepared for phenolic moulding materials, industrial phenolic laminates and other laminates, decorative laminates, rigid PVC compounds, PVC polymers, polyethylene, polypropylene, polystyrene, polyamides and the component materials for glass-fibre reinforced plastics. Work is well advanced on other projects and the establishment of a task group to work on aminoplastic moulding materials was approved.

Dr. KLINE, who was present at the Budapest meeting as USA delegate of WG 1 stated that this group had tabled a second draft proposal on "Definitions of Plastics Terms". This Working Group also intends to study definitions of terms relating to properties of plastics.

Classification of plastics statistics

Information has been assembled by Dr. KLINE to enable him to proceed with the preparation of the document.

Progress will be reported at next meeting.

Crystallinity of polymers

Dr. NATTA previously stated that he had a document on this subject in preparation which should be of interest to this Section. No report has been submitted to-date.

Corrosion resistance of polymers

Dr. DUBOIS will present the main lecture covering the above subject at the International Symposium on Macromolecular Chemistry, Prague.

Dr. DUBOIS stated that ageing under hot-humid and hot-dry conditions was being studied. Ageing of plastics can be determined by measuring their diminution of transmission of ultraviolet light and change in permeability to oxygen.

Compilation of National Standards for plastics end products

Dr. KLINE stated that many countries were concerned with quality standards for plastic products and he thought a compilation of National Standards in this field would have international interest. Thus it was proposed to compile these National Standards, which are available generally as separate reprints, for distribution by IUPAC or other suitable clearing house to interested experts.

Relationship of performance characteristics to basic parameters of polymers

Dr. J.W. BARRETT, Chairman of the Working Party, summarized the progress on this programme. A report entitled "Dynamic Mechanical and Impact Properties of Polystyrene" has been completed. It presents the results and analysis of an investigation participated in by laboratories in six countries. A paper summarizing the results will be presented at the Macromolecular Symposium in Prague, 30 August to 4 September, 1965, and it will appear later in the Proceedings of that meeting. The original report with test procedures and test data is available on loan from the Working Party Chairman. Two additional reports on polyethylene and polyvinyl chloride respectively are expected to be completed within the next twelve months.

The second phase of the programme will deal with the correlation of rheological properties with the processing of polymers. Eventually, through a correlation of basic physical measurements with molecular weight distribution of polymers and with processing properties of polymers, one may anticipate the direct correlation of molecular weight distribution of polymers with their processing characteristics. This may be illustrated diagramatically as follows:

Engineering Processing → Basic → Polymer Molecular wt. distribution
Properties ← Physical ←
(Calendering, extrusion, Properties
moulding characteristics)

Dr. BARRETT stated that the scope of this work required more active collaborators who could provide laboratory assistance to the programme. He also would like to see more countries represented in this programme.

Dr. DUBOIS requested that the Centre d'Etude Matières et Plastiques be included as one of the active participating laboratories in this study. He agreed to send to Dr. BARRETT the name of the Secretary of the French Rheological Society to contact for collaboration on the second phase of this study.

A. GROSS stated that he would be pleased to offer the services of the laboratories of Péchiney-Saint Gobain in the measurement of both mechanical and rheological properties of PVC.

Dr. WINTERGERST will approach Dr. OBERST of Hoechst *re* his willingness to participate in this programme and Dr. BARRETT will contact Dr. FINDLEY, Brown University, concerning his participation in these studies. Dr. FINDLEY has been very active in studying creep in plastics.

The problem of distribution of reports which are generated by the various Task Groups of the Plastics and High Polymers Section, was broached by Dr. BARRETT. It was thought that policy guidance should be requested from IUPAC. Perhaps reports could be distributed through a central IUPAC clearing house. If such a mechanism for distribution of reports does not exist within IUPAC, this Section will have to investigate other arrangements.

The next meeting of this Task Group will be held in Brussels in October.

Correlation of solid state properties of plastics with engineering requirements and characteristics

Dr. BARRETT drew attention to the big void in our knowledge of the solid states of polymers. Physical studies and theory are lacking in this area, but this information is extremely important to the progress of the plastics industry.

Dr. BARRETT asked if there exists any mechanism within IUPAC to transfer such problems or requests for information from one group to another.

Plastic materials in the building industry

Mr. M. RODEYNS (Belgium) agreed to obtain official requirements for plastics in construction from each of the countries represented in the Plastics and High Polymers Section. A compilation of these regulations will be made available to members for consideration of their limited distribution or publication.

Mr. DRING reported that Europrefab had held its first meeting in November 1964 in Milan and an account of its activities was published in Interbuild, December 1964, p. 9. The full title of Europrefab is the European Organization for the Promotion of Prefabricated and Other Industrialized Building Procedures. Its frame of reference includes plastics in building.

A three-day Conference on Plastics in Building Structures was held in London from 14–16 June, 1965, by the Plastics Institute. The Conference

Proceedings will be published later in the year in book form by Pergamon Press.

Plastics in the automotive industry

A survey will be conducted on the use and critical requirements of plastics with improved engineering properties in the automotive industry. Dr. McKay has consented to serve as Chairman of this Task Group.

Election of members

The terms of the Secretary (Dr. McKay) and one Titular Member (Dr. Akutin) expired at the XXIIIrd Conference. Dr. McKay was elected to another four-year term as Secretary and Mr. Rodeyns (Belgium) was elected to the Titular Member vacancy. Dr. Jean Vessereau was elected to replace Dr. F. Ecochard as a National Representative of France. Dr. Akutin was added as a second National Representative from the USSR. A revised list of Officers and Members will be forwarded to the members at a later date.

The Chairman, Dr. Kline, moved a vote of thanks to Dr. Dubois for the fine facilities and gracious hospitality provided for the members of this Section.

Arthur F. Mc Kay, Secretary

VI.8 Organic Coatings Section

Report of meetings during the Paris Conference

The Section met on 1, 2, and 3 July, and plenary sessions were held on 1 and 3 July.

Members present: Mr. H.K. Raaschou Nielsen, Chairman (Denmark); Dr. R. Bult, Secretary (Netherlands); Mr. A. Cailliez (Belgium); Mr. P.H. Fink-Jensen (Denmark); Mr. L.R. Hickson (UK); Dr. M.I. Huss (Sweden); Dr. J.A.W. van Laar (Netherlands); Dr. K.M. Oesterle (Switzerland); Mr. L.A. O'Neill (UK); Dr. J. Petit (France); Mr. H. Rabate (France); Dr. H.W. Talen (Netherlands); Dr. D. Wapler (Germany); Mr. Zaitoun (France). Furthermore, Dr. C.O. Gabrielson from the Applied Chemistry Division Committee and Mr. W.E. Lee, liaison officer from the Oils and Fats Section to the Organic Coatings Section, were present during the first plenary session.

Before the opening of the meeting, one minute's silence was observed in memory of the founder and former president, Dr. Louis Arnold Jordan, who had passed away on 1 December, 1964.

(1) *Minutes of previous meeting*

The minutes of the meeting in Stuttgart, Germany, on 25–27 October, 1964, which had been circulated, were approved.

(2) *Sub-Committee on Analytical Methods*

Mr. Hickson reported that he had spoken to the Scientific Editor of the Editorial Board, Prof. B.C.L. Weedon, regarding IUPAC publications. With regard to the "Recommended Methods for the Analysis of Drying Oils", which had been worked out by the Sub-Committee on Analytical

Methods and forwarded to the Editorial Board in April, 1964, he informed that the Scientific Editor feels that it would lower the prestige of the Union if two sets of methods for the analysis of vegetable oils were published, unless the necessity for the points of difference between the two sets was clearly pointed out. Mr. HICKSON also emphasized that the Editorial Board was strongly against having the analytical methods published in a loose-leaf form and that they would prefer to have the normal method of binding.

As a consequence of the discussions following Mr. HICKSON's remarks, a small working party was formed which worked out additions to the analytical methods of the Sub-Committee. In these additions it is clearly stated on which points the methods for the analysis of drying oils differ essentially from the corresponding methods worked out by the Oils and Fats Section. These additions have been forwarded to Prof. WEEDON, with copies being sent to the Oils and Fats Section.

As far as the form of publication is concerned, it was unanimously agreed in the Organic Coatings Section to suggest to the Editorial Board that the methods for the analysis of drying oils be published in "Pure and Applied Chemistry", on the condition that a sufficient number of reprints of the methods can be obtained.

A co-operative investigation of two methods for the determination of the hydroxyl value of alkyd resins has been carried out as a "round robin" test in seven member laboratories. The investigation showed that there was excellent agreement between the results obtained in the different laboratories and that the two methods gave practically speaking identical hydroxyl values.

In the coming year the Sub-Committee will continue its work on methods for the analysis of alkyd resins, since these are the most important synthetic resins used in the organic coatings industry. It has been decided to work out methods for the determination of acid value and saponification value of alkyd resins as well as for the qualitative and quantitative determination of fatty acids, polybasic acids and polyalcohols in these synthetic resins.

(3) *Sub-Committee on Testing Procedures*

The manuscript of the booklet "Hardness of Organic Coatings" is practically finished and is expected to be forwarded through proper channels to the Editorial Board before the middle of September this year. The length is approximately 75 typewritten pages.

The main activities of the Sub-Committee on Testing Procedures at present is concerned with the rheological properties of liquid paints. This very important work has been initiated at the request of the Harmonization Commission of the European Federation of Associations of the Paint, Varnish and Printing Ink Manufacturers. A preliminary investigation has been carried out in the spring of 1965, in which five paints distributed to 12 member laboratories have been investigated for brushability, levelling and sagging by instrumental methods as well as subjectively by professional painters. During the meeting Dr. OESTERLE (Switzerland), Dr. VAN LAAR (Netherlands), Dr. WAPLER (Germany) and Mr. FINK-JENSEN (Denmark) reported on the work they had carried out with lesser known instruments as their part of the investigation.

A preliminary report on the results obtained so far was discussed quite extensively during the Meeting in Paris, and it was agreed to work out a concise report as quickly as possible, after which a small working party will meet in Copenhagen before the end of this year to plan the work to be carried out by the members before the Section meets again at an interim meeting in Zurich in the autumn of 1966.

(4) *Sub-Committee on Terminology*

Under the chairmanship of Mr. H. RABATE (France) this Sub-Committee has for a number of years done a great amount of work for the purpose of compiling a trilingual dictionary on paint terms, a work of such a scope that a substantial amount of money would be needed for the technical and secretarial help in connection with the finishing of the dictionary. At the last meeting of the Applied Chemistry Division in London the Organic Coatings Section was informed that the Editorial Board could not recommend financial support for this project, and the work has since been carried out by Mr. RABATE as a private person.

Since no other work on the terminology of paint terms is contemplated in the near future it was decided during the present meeting in the Organic Coatings Section to recommend to the Division that the Sub-Committee on Terminology be discontinued.

(5) *Membership*

Dr J.A.W. VAN LAAR (Netherlands) and Mr. A. CAILLIEZ (Belgium) who have been Titular Members for four years were replaced by Mr. L. A. O'NEILL (UK) and Mr. P.H. FINK-JENSEN (Denmark) as Titular Members. Furthermore, it was decided to suggest to the General Secretary of the Union that Prof. D. PAGANI be elected National Representative from Italy.

(6) *Next meeting*

It was decided during the sessions that an interim meeting of the Section be held in Zurich, Switzerland, in September 1966.

(7) *Publications*

After the meetings in the Section the chairman has had a conversation with the Scientific Editor of the Editorial Board, Prof. WEEDON, who informed that the analytical methods worked out by the Sub-Committee on Analytical Methods as well as the booklet on "Hardness of Organic Coatings" may be published in the journal "Pure and Applied Chemistry", and that reprints of these publications can be obtained in as many copies as needed.

H.K. RAASCHOU NIELSEN, Chairman

VI.9 Pulp, Paper and Board Section

The Section met on 3 July at 9 a.m. and again at 2 p.m. and on 5 July at 9 a.m. in Paris at the Conservatoire des Arts et Métiers.

Present: Prof. WALDEMAR JENSEN (Finland), Chairman; Prof. LENNART STOCKMAN (Sweden), Vice-Chairman; Dr. KYLE WARD, Jr. (USA), Secretary; Dr. JULIUS GRANT (UK); Dr. EDOARDO GRANDIS (Italy); Dr. C.A. SANKEY (Canada); Dr. RUDOLF M. SCHEPP (Germany).

Dr. JEAN CHÉDIN of France was absent.

The Minutes of the previous meeting and the Chairman's Report were read, discussed, and approved.

(1) *Symposium in Helsinki*

The next active item on the general programme of the Section will be a Symposium in Helsinki, 24–27 May, 1966, on the subject of "Dissolving

Pulps". There will be two major subdivisions—high wet-modulus fibres and cellulose acetate. This is now being arranged under the direction of Dr. HANNES SIHTOLA. Papers of about 30 minutes duration and short communications of 10 minutes duration are now being arranged by invitation. There will be 10 minutes allowed for discussion of the longer papers and 5 minutes for the shorter communications. The programme planned will include approximately 12 of the former and 20 of the latter. It will be a joint meeting with EUCEPA.

(2) *Press relations*

About 50 periodicals have been sent press notices on the Symposium. Dr. GRANT suggested that the national technical associations of the industry also be contacted as soon as possible for additional publicity and co-operation and this was agreed upon. Prof. JENSEN will get in touch with the organizing committee about this.

(3) *Commission for Cellulose Analysis*

According to the Statutes of IUPAC, Commissions should have only a four-year life. The International Commission for Cellulose Analysis (ICCA) became affiliated with the Pulp, Paper and Board Section as a Commission in 1959 and the question of duration has therefore been raised. In accordance with regulations, the Section has decided to discontinue the affiliation.

(4) *Commission on Paper Analysis*

The Section has already been authorized to establish a Commission on Paper Analysis. It was decided at this meeting to channel the initial activities into the compilation of a literature survey on chemical methods in paper analysis in order to establish the most desirable goals and the most promising lines of attack. Several suggestions were made for a suitable Chairman. It was agreed that Dr. BENGT LEOPOLD, director of the Empire State Paper Research Institute at Syracuse, NY, be approached by the Secretary as to his willingness to serve as Chairman of the new Commission.

(5) *Meeting in 1967*

The Section does not wish to schedule unnecessary international meetings, but it is felt that there is a need for a meeting on the chemical aspects of papermaking. It will be remembered that a meeting in Paris in 1965 was not feasible because of conflicts with other meetings. It was agreed to try to arrange one in 1967 in Prague in connection with the IUPAC Conference and Congress. The Section Chairman, Prof. JENSEN, will get in touch with Dr. HAVRANEK of Czechoslovakia for the arrangements. They will decide whether to cover chemical aspects of papermaking of or the paper packaging fields.

(6) *Committee*

In discussing the vacancy on the Section Committee caused by the expiration of Prof. CHÉDIN's term of office as Titular Member, the plan developed in 1961 for allotment of members was discussed and again approved. This calls for appointment as soon as feasible of a Titular Member from the USSR. The name of Dr. ROGOVIN was agreed upon.

In further accordance with the earlier plans Associate Members are to be invited to join the Committee. Five countries are considered:

(a) France – Monzies preferred, with Roudier as an alternative choice
(b) Czechoslovakia – Havranek, if possible.
(c) Japan – The Secretary will contact Japanese TAPPI for suggestions
(d) Norway – Anker-Rasch, if possible
(e) Australia – Cohen, if possible

The present officers serve until 1967, but the Committee will consider suitable successors between now and the Prague meeting.

(7) *Informal research conferences*

At the IUPAC Meetings in London in 1963, the possibility of establishing informal research conferences along the lines of the Gordon Research Conferences in the United States was discussed. The Pulp, Paper and Board Section discussed the applicability of such groups to our work, but did not make any recommendations.

(8) *Next meeting*

The Section Committee will meet next in Prague in 1967. It adjourned Monday morning at 11 a.m.

Kyle Ward, Secretary

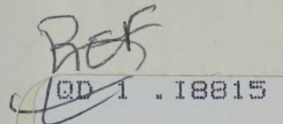
LIST OF ABBREVIATIONS

AOAC	Association of Official Agricultural Chemists
CBN	Commission on Biochemical Nomenclature
CEBJ	Commission of Editors of Biochemical Journals
CEE	Communauté Economique Européenne
CIG	Comité International de Géophysique
CIPM	Comité International de Poids et Mesures
CITCE	Comité International de Thermodynamique et Cinétique Electrochimique
CNRS	Centre national de la Recherche scientifique
COMECON	Council for Mutual Economic Assistance
COSPAR	Committee on Space Research
CSF	Compagnie Télégraphie Sans Fil
CSIRO	Commonwealth Scientific and Industrial Research Organization
DECHEMA	Deutsche Gesellschaft für chemisches Apparatewesen eV
EEC	European Economic Community
EMPA	Eidgenössische Materialprüfungs-Anstalt
EPPO	European and Mediterranean Plant Protection Organization
ETH	Eidgenössische Technische Hochschule (Zürich)
EUCEPA	European Committee on Cellulose and Paper
EUROTOX	Comité européen permanent pour la Protection des populations contre les risques de toxicité à long terme
FAGS	Fédération of Astronomical and Geophysical Services
FAO	Food and Agriculture Organization
GEFAP	Groupement européen des Associations nationales de Fabricants de Pesticides
IAEA	International Atomic Energy Agency
IAMS	International Association of Microbiological Societies
IAPT	International Association for Plant Taxonomy
IASH	International Association of Scientific Hydrology
IAU	International Astronomical Union
IBP	International Biological Programme
ICCA	International Commission for Cellulose Analysis
ICSU	International Council of Scientific Unions
ICUMSA	International Committee for the Unification of Methods of Sugar Analysis
IGU	International Geographical Union
IMU	International Mathematical Union
ISO	International Organization for Standardization
ITU	International Telecommunication Union
IUB	International Union of Biochemistry
IUBS	International Union of Biological Sciences
IUCr	International Union of Crystallography
IUGG	International Union of Geodesy and Geophysics
IUGS	International Union of Geological Sciences
IUNS	International Union of Nutritional Sciences
IUPAC	International Union of Pure and Applied Chemistry
IUPAP	International Union of Pure and Applied Physics
JCAM	Joint Commission on Atomic Masses
JCAR	Joint Commission on Applied Radioactivity
MIT	Massachusetts Institute of Technology
NAS	National Academy of Sciences

NATO	North Atlantic Treaty Organization
NBS	National Bureau of Standards
NRC	National Research Council
OECD	Organisation de Coopération et de Développement économiques
OEPP	Organisation européenne de Protection des Plantes
OMS	Organisation Mondiale de la Santé
SCAR	Scientific Committee on Antarctic Research
SCOR	Scientific Committee on Oceanic Research
UICC	Union internationale contre le Cancer
UNESCO	United Nations Educational Scientific and Cultural Organization
WHO	World Health Organization
WMO	World Meteorological Organization

TABLE OF CONTENTS

	Page
Obituaries	4
Introduction	5
Opening Lecture, Prof. J. TRÉFOUËL—French	6
English	12
Official Delegates of National Adhering Organizations at the XXIIIrd Conference	18
National Adhering Organizations	26
Bureau 1965–67	28
Organization Chart	30
Finance Committee	32
Committee on Teaching of Chemistry	32
Inter-Divisional Committee on Nomenclature and Symbols	32
Composition of Divisions	
Physical Chemistry	33
Inorganic Chemistry	49
Organic Chemistry	54
Biological Chemistry	57
Analytical Chemistry	61
Applied Chemistry	71
President's Report on the State of the Union—English	88
French	94
Biennial Report of the Honorary Treasurer, 1963–64—English	101
French	105
Report of Finance Committee	114
Report of the Committee on Teaching of Chemistry—English	115
French	118
Editorial Advisory Board—Minutes of Meeting	121
Report of Meeting of Chairmen of Nomenclature Commissions of IUPAC	124
Agenda for the XXIIIrd Conference—Council Meeting	125
Minutes of the XXIIIrd Conference—Council Meeting	126
Agenda for the 17th Bureau Meeting	137
Minutes of the 17th Bureau Meeting	138
Minutes of the 18th Bureau Meeting	144
Chart of Future Activities	144
Reports and Activities of Divisions	
Physical Chemistry	147
Inorganic Chemistry	165
Organic Chemistry	192
Biological Chemistry	200
Analytical Chemistry	205
Applied Chemistry	228
List of Abbreviations	279


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